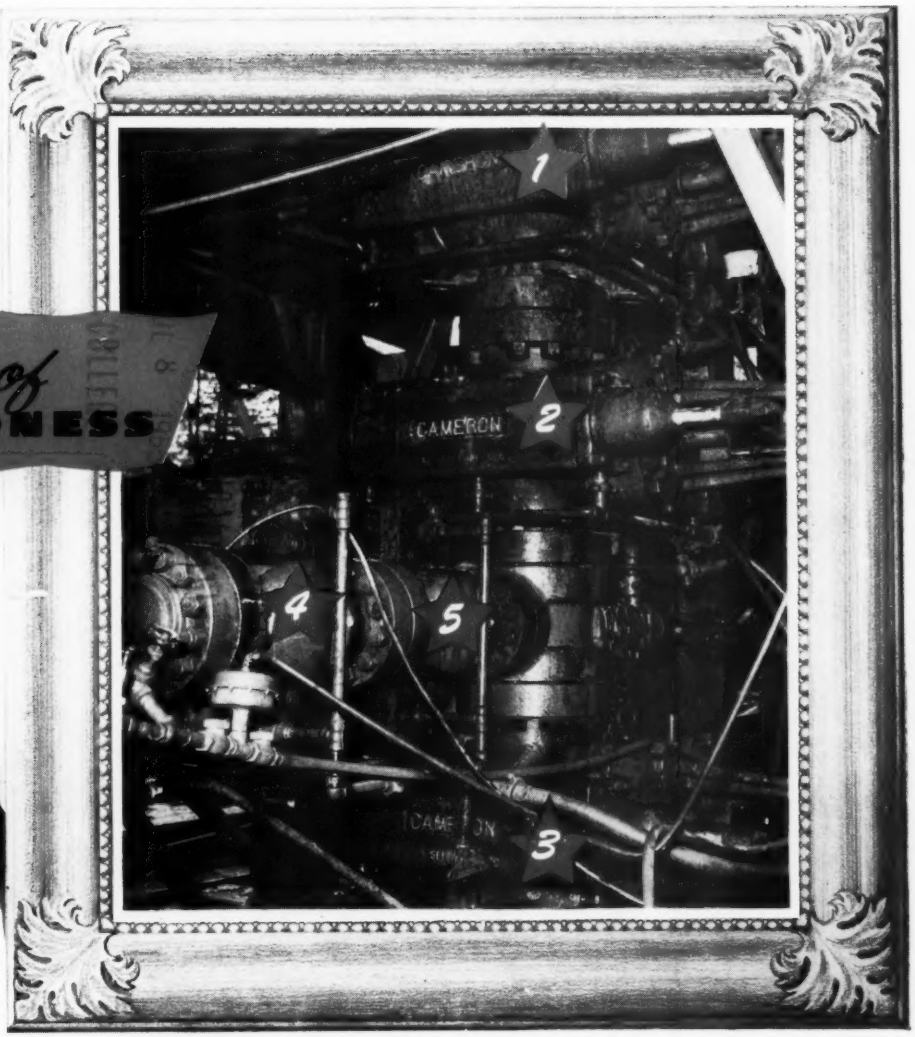
the OIL AND GAS JOURNAL

Picture of **PREPAREDNESS**



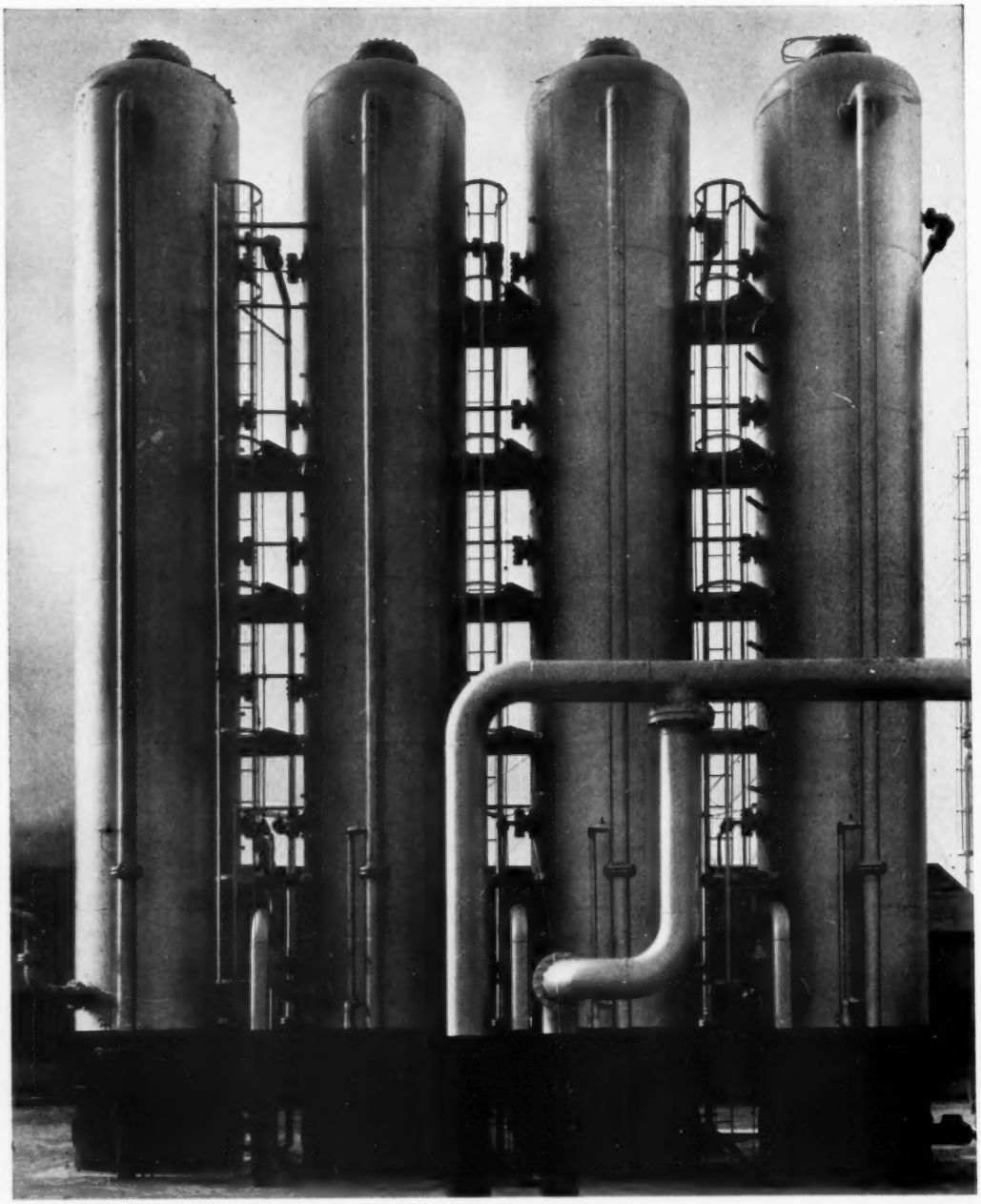
While Cameron pressure-operated drilling control units may be assembled in several safe and convenient hook-ups, the assembly presented above—installed on a deep test in South Louisiana—is probably the most popular combination of control units. It consists of (1) and (2) 10-inch Series 1500, QRC Blowout Preventers equipped with pipe rams; (3) 10-inch, Series 1500, QRC Blowout Preventers equipped with blind rams for closing the well bore with pipe out of the hole; (4) and (5) 6-inch, Series 1500, HCR Gate Valves to provide a double safeguard against loss of control thru the flow line.

Interested operators are invited to write for descriptive literature or refer to The Composite Catalog for complete details.

Cameron **IRON WORKS, INC.**

P. O. BOX 1212 HOUSTON, TEXAS
Export: 74 Trinity Pl., New York, N. Y.

PRICE 20 CENTS TABLE OF CONTENTS PAGE 41 **DECEMBER 9, 1948**



ABSORBERS FOR WEST TEXAS

•

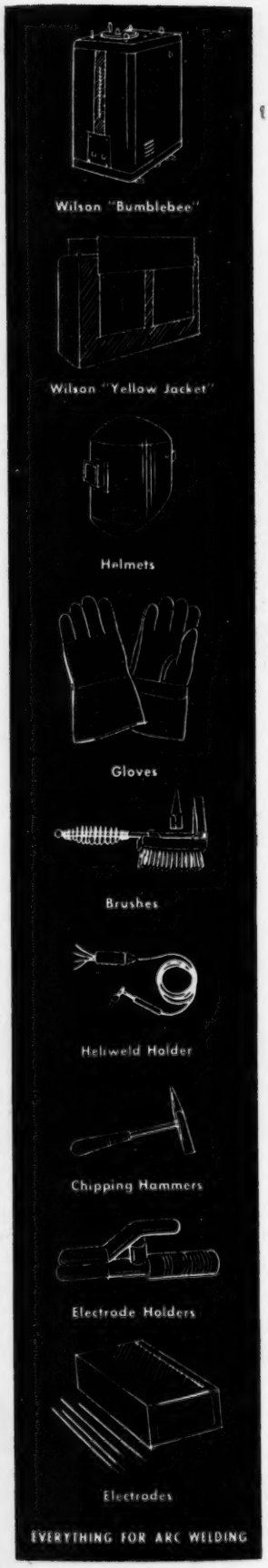
Efficient and low-cost operation assured through proper design and precision fabrication from quality materials.

•

WYATT METAL & BOILER WORKS

Wyatt's

HOUSTON - DALLAS



Airco Stainless Steel Electrodes

GIVE YOU SMOOTH, POROSITY-FREE WELDS ...FASTER...AT LESS COST

Metal fabricators find that Airco stainless steel electrodes produce porosity-free welds of smooth, uniform appearance . . . extremely important when sanitation, appearance or similar demands require highly polished, machined-down surfaces.

For example, one user says: "We were looking for a rod to fabricate stainless steel soup kettles. We tested them all—Airco 19-9 stainless produced the best welds. They were porosity-free, smooth and more uniform in appearance—just what we wanted."

Airco Stainless Steel electrodes are available for A.C.-D.C. application (titinia coating) . . . for D.C. application only (lime coating). Whenever possible, A.C.-D.C. electrodes are recommended because, when used on A.C., arc blow is eliminated. This means easier handling in all positions, more uniform arc action, and better appearance of deposit. Both types produce an easily removed slag coating.

For further information regarding Airco's extensive stainless steel electrode line, or any other arc welding electrodes, write for a copy of our latest Electrode Catalog (ADC-650). For your free copy, address Dept. OG-8773, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California. Represented Internationally by Airco Export Corporation.

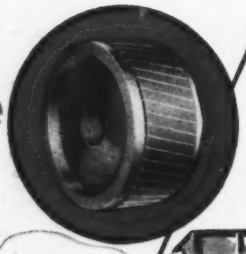
AIRCO **AIR REDUCTION**

Offices in All Principal Cities

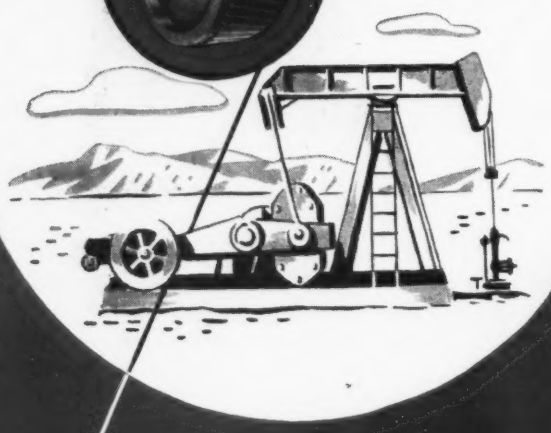
Headquarters for Oxygen, Acetylene and Other Gases...Carbide...Gas Welding and Cutting Machines, Apparatus and Supplies...Arc Welders, Electrodes and Accessories

only the **QZK**

has the



Copper spun **Rotor!**



When it comes to motors . . .

. . . the one-piece, indestructible rotor that assures the ability to stand up under the heavy starting loads . . . the strains of peak capacity operation for long periods found in pumping rig service. The Fairbanks-Morse QZK polyphase, squirrel cage protected frame motor is designed for durability . . . to provide true dependability, smooth, quiet operation for every pumping application. Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL ENGINES
DIESEL LOCOMOTIVES • PUMPS
SCALES • MOTORS • FARM EQUIPMENT
RAILROAD MOTOR CARS and STANDPIPES
GENERATORS • STOKERS • MAGNETOS

MACCLATCHIE "Money-Saver" PUMP LINERS

· · · just have to give

BETTER SERVICE

WHY? · · · *because they are much harder than other makes of liners!*

They are harder because they are made of special carborizing seamless tubing which permits a hardening process resulting in that extra hardness that just has to give better service.

PRECISION SUPER HONED FINISH

▲ ▲ ▲

FINISHED TO A.P.I. SPECIFICATIONS

CHECK THE HARDNESS

Make this simple test yourself. Take a sharp piece of tool steel or the sharp edge of a file and drag it through the bore of a MacClatchie liner. Then do the same on other makes you have on hand. You be the judge.

CHECK THE FIRST COST

MacClatchie "Money-Saver" Liners are lower in price than most other makes. MacClatchie prices include XXX oil-resisting rubbers. (Not priced extra as done by most other manufacturers.) There is also a saving on shipping weight and in some cases a marked saving due to the removable slip-on glands.

CHECK THE PERFORMANCE

MacClatchie "Money-Saver" Liners with the new precision hone bore and extra hardness give that better service. One installation will convince you.

MACCLATCHIE MANUFACTURING CO.

COMPTON, CALIFORNIA — BELLE CHASSE, LOUISIANA

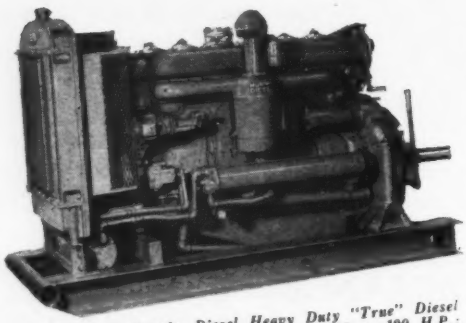
AT LEADING SUPPLY STORES EVERYWHERE

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1948.

Get the most profit out of your jobs with MURPHY DIESEL POWER

the Murphy Unit Injector
. . . heart of the MURPHY DIESEL
A simple, dependable unit injector for each cylinder serves as both pump and nozzle and eliminates all high Pressure fuel lines.

Two Murphy Diesels power the rotary drilling rig and the mud pump in this installation.



Murphy Diesel Heavy Duty "True" Diesel Engines and Power Units 90 to 190 H.P.; Generator Sets, 60 to 116 K.W., A.C. or D.C.

The Murphy Diesel is ruggedly built to give dependable service under the severest operating conditions. And it is economical too. The "true" diesel operating principle — solid fuel injected directly into a plain open combustion chamber — makes it possible to get the most power out of every drop of fuel. The Murphy Diesel stays on the job longer—ordinary fuel injection troubles are unknown . . . four valves per cylinder run cooler, rarely, if ever, have to be ground . . . dual overhead camshafts driven from the flywheel end minimize timing faults.

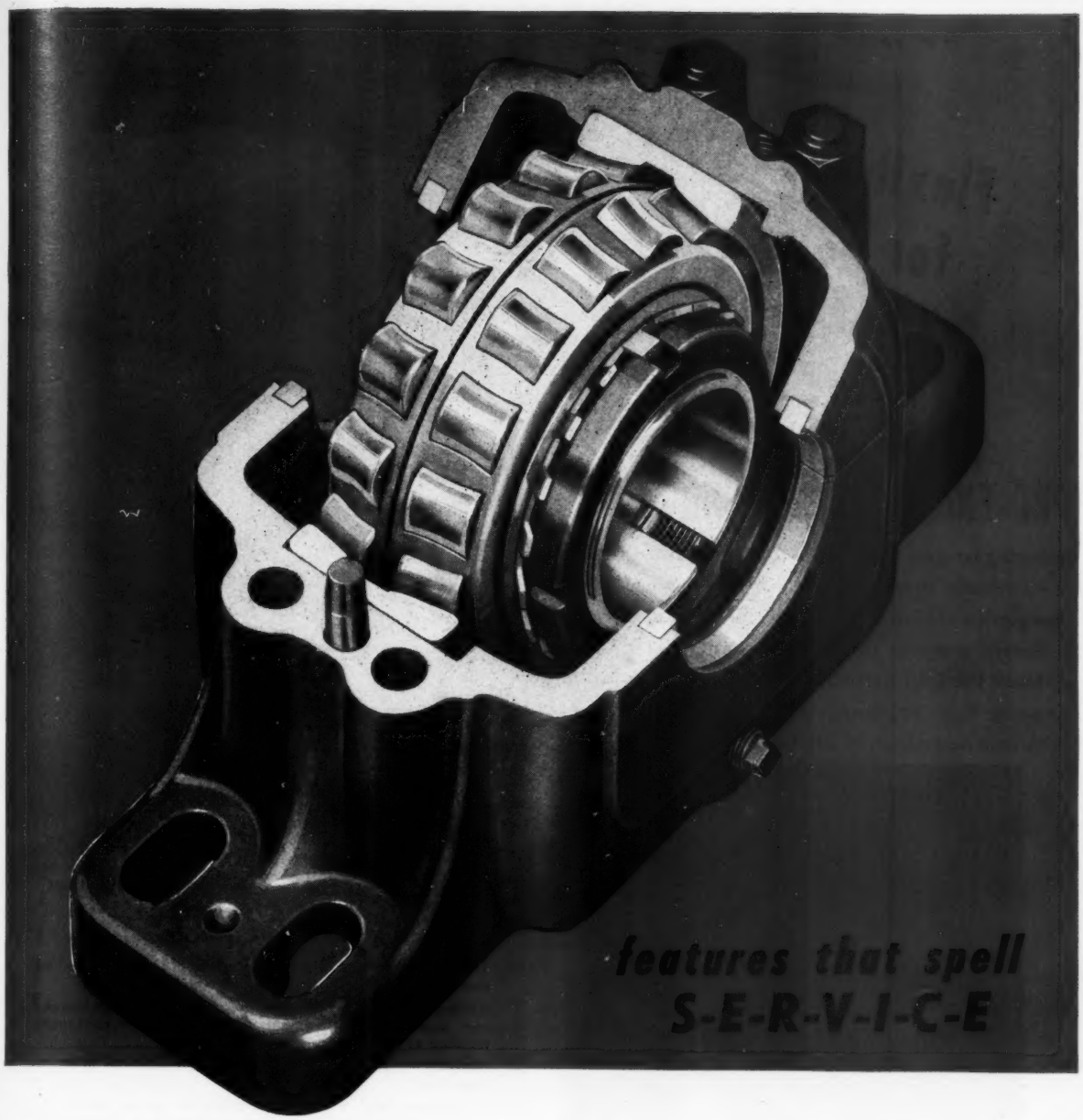
This combination of economy and dependability means more profit for you. Ask your Murphy Diesel Dealer to give you full details. And be sure and get a copy of the booklet *"7 Questions to Ask a Diesel Engine Salesman"*.

MURPHY DIESEL COMPANY
5305 West Burnham St., Milwaukee 14, Wis.

LOWEST ULTIMATE POWER COST

FACTORY BRANCH—SALES, PARTS and SERVICE
416 SOUTH DETROIT AVENUE, TULSA, OKLAHOMA

MURPHY DIESEL



Self-aligning, free-rolling action

E ffective seals keep grease in, dirt out

R adial-Thrust load capacity is high

Various mountings for all applications

I n stock at all industrial centers

C ompact, sturdy housings require minimum space

E conomical, efficient and dependable operation

LINK-BELT COMPANY Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities. 11,308

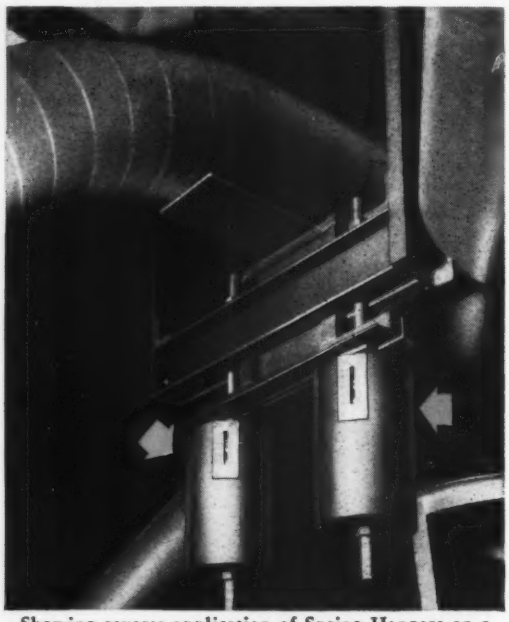
LINK-BELT *Ball and Roller BEARINGS*

Flexible support for pipe that S-T-R-E-T-C-H-E-S

with GRINNELL PRE-ENGINEERED SPRING HANGERS

Selecting hangers for piping subject to thermal movement is completely simplified. Grinnell Pre-Engineered Spring Hangers are available in stock sizes for any load requirement.

Simply compute the load and order the proper size Grinnell Pre-Engineered Spring Hanger as indicated in the Capacity Table appearing in descriptive catalog. 14 sizes with load range from 84 lbs. to 4,700 lbs.



Showing reverse application of Spring Hangers on a flexible piping support.

Flexible suspension of piping in one of world's largest catalytic cracking plants.

LOOK AT THESE FEATURES . . .

- **The maximum variation in supporting force per ½" of deflection is 10½% of rated capacity—in all sizes.**
- **Guides prevent contact of coils with casing wall or hanger rod and assure continuous alignment and concentric loading of spring.**
- **Compact—minimum headroom made possible by precompression*.**
- **Precompression* assures operation of spring within its proper working range where variation in supporting force is at a minimum.**
- **All-steel welded construction meets pressure piping code.**
- **14 sizes available from stock—load range from 84 lbs. to 4700 lbs.**
- **Easy selection of proper sizes from simple capacity table.**
- **Installation is simplified by integral load scale and travel indicators.**
- **Unique swivel coupling provides adjustment and eliminates turnbuckle.**

Precompression is a patented feature

Write for descriptive folder on Pre-Engineered Spring Hangers Fig. 268.

GRINNELL COMPANY, INC.
Providence 1, R. I.

Branch Warehouses

Atlanta 2, Ga.	Kansas City 16, Mo.	Philadelphia 34, Pa.
Charlotte 1, N. C.	Long Beach 10, Cal.	Sacramento 14, Cal.
Chicago 9, Ill.	Los Angeles 13, Cal.	St. Louis 10, Mo.
Cleveland 14, O.	Milwaukee 3, Wis.	St. Paul, Minn.
Cranston 7, R. I.	Minneapolis 15, Minn.	San Francisco 7, Cal.
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Houston 1, Tex.	Oakland 7, Cal.	Spokane 15, Wash.

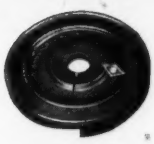
GRINNELL

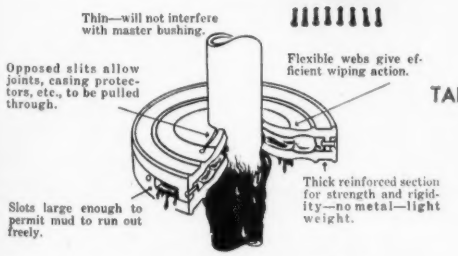
WHENEVER **PIPING** IS INVOLVED

Clean Pipe

WITH THE

TANDEM Pipe Wiper




Thin—will not interfere with master bushing.
Opposed slits allow joints, casing protectors, etc., to be pulled through.
Flexible webs give efficient wiping action.
Thick reinforced section for strength and rigidity—no metal—light weight.
Slots large enough to permit mud to run out freely.

Patterson-Ballagh announces the new, field proven TANDEM Pipe Wiper. Easier to install than two single pipe wipers, this efficient TANDEM will wipe your drill pipe *clean* no matter how *fast* you come out of the hole.

REPLACEABLE HALVES FOR ECONOMY—Identical halves and light hard rubber pins make up the TANDEM. Should either half become worn, only that half need be replaced. Each replacement half supplied with new pins. Halves easily assembled into rigid unit.

TANDEM WIPER FOR EFFICIENCY—Any mud the lower wiper misses, the upper wiper is sure to get. Wipers are spaced far enough apart to prevent mud caking, yet close enough so there is no interference with Kelly bushing.

For top pipe wiper performance, use the new Patterson-Ballagh TANDEM on your rig. For more information, write for Bulletin No. 2-48.

Specify

PATTERSON-BALLAGH

DIVISION OF BYRON JACKSON CO.

TANDEM PIPE WIPERS

PATTERSON BALLAGH · SEAL OF QUALITY · OIL FIELD SPECIALTIES ·

MAIN OFFICE: 1900 EAST 65TH STREET, LOS ANGELES 1, CALIFORNIA

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Yours the problem - Harveys the answer!

Whenever you have a Screening, Sorting or Grading problem—remember Harveys. Because Harveys have been making perforated metal screens for every conceivable purpose in every kind of metal for over 70 years. There is available a perforation to meet all normal industrial requirements. Fuller details are available in Catalogue OG 450.

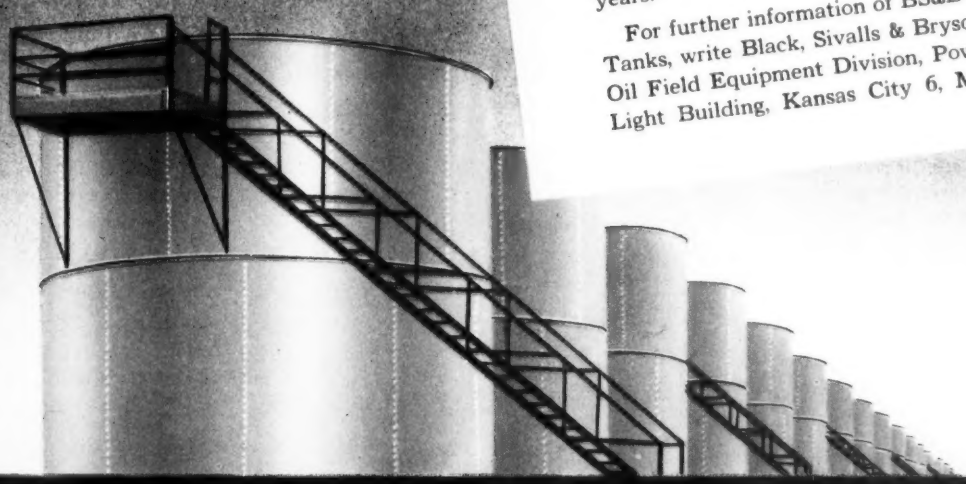
G. A. Harvey & Co. (London) Ltd. Woolwich Road. London. S.E.7

BLACK, SIVALLS & BRYSON, INC.

TOP NAME in BOLTED TANKS

Black, Sivalls & Bryson meets the oil industry standard of the world for bolted tanks. Speedily erected by BS&B's erection crews, BS&B Bolted Tanks are as swiftly and easily taken down, trucked to new locations, and re-erected! Many in oil field service have been moved time and again—are still in use after 15 to 20 years!

For further information of BS&B Bolted Tanks, write Black, Sivalls & Bryson, Inc., Oil Field Equipment Division, Power and Light Building, Kansas City 6, Missouri.



EFFICIENCY
BS & B
RELIABILITY

"Up she goes" in short order, as the Black, Sivalls & Bryson erection crew completes another Bolted Steel Tank installation. Day or night, rain or shine, these skilled workers are available for experienced, skilled service on oil field equipment. BS&B branches are located near every producing oil field.

When something happens, it happens in a hurry in the oil business. Steps must be taken quickly . . . and correctly . . . when a well comes in. That's why oil men depend on the Black, Sivalls & Bryson branch close by every producing field.

BS&B tank erection crews are frequently called upon to do an installation job from grading and setting the concrete foundation through the bolting and sealing of the staves and connecting the pipe—all in twenty-four hours.

BS&B renders this service to its oil field customers at no material profit—just another means of building and preserving customer good will.

Among the BS&B products quickly available at any of the BS&B plants and branches are Flow Treaters ● Chemical Feeders ● Indirect Heaters ● Bolted Steel Tanks ● Blow Cases ● Domestic Propane Systems ● Foundry Flasks ● Safwalk Loading Racks, Walkways and Loading Docks ● Oil and Gas Separators ● Vent Valves ● Welded Steel Tanks ● Gas and Oil Valves ● Wood Tanks ● Oil Meters ● Bulk and Truck Propane Tanks ● Gas Scrubbers and many others.

Company Erection Crews Complete Each Installation Insuring Efficient Operation

These units form Black, Sivalls & Bryson. Executive Offices: POWER AND LIGHT BUILDING, KANSAS CITY 6, MISSOURI. *Steel Plants:* KANSAS CITY, MISSOURI; OKLAHOMA CITY, OKLAHOMA; CASPER, WYOMING; CALGARY, ALBERTA. *Wood Tank Plants:* ELLINWOOD, KANSAS; BLACKWELL, OKLAHOMA; OKLAHOMA CITY, OKLAHOMA; BORGER, TEXAS; ODESSA, TEXAS; CASPER, WYOMING. *Branches:* CRAIG, COLORADO; RANGELY, COLORADO; CARMI, ILLINOIS; SALEM, ILLINOIS; ELLINWOOD, KANSAS; HAYS, KANSAS; MCPHERSON, KANSAS; LAFAYETTE, LOUISIANA; SHREVEPORT, LOUISIANA; MT. PLEASANT, MICHIGAN; BROOKHAVEN, MISSISSIPPI; CUT BANK, MONTANA; HOBBS, NEW MEXICO; BLACKWELL, OKLAHOMA; DRUMRIGHT, OKLAHOMA; DUNCAN, OKLAHOMA; OKLAHOMA CITY, OKLAHOMA; SEMINOLE, OKLAHOMA; ALICE, TEXAS; BIG SPRING, TEXAS; BORGER, TEXAS; GRAHAM, TEXAS; HOUSTON, TEXAS; KILGORE, TEXAS; LUBBOCK, TEXAS; NOCONA TEXAS; ODESSA, TEXAS; CASPER, WYOMING; POWELL, WYOMING; CALGARY, ALBERTA. *Sales Offices:* LOS ANGELES, CALIFORNIA; GREAT BEND, KANSAS; WICHITA, KANSAS; SHREVEPORT, LOUISIANA; KANSAS CITY, MISSOURI; CUT BANK, MONTANA; NEW YORK CITY, NEW YORK; OKLAHOMA CITY, OKLAHOMA; TULSA, OKLAHOMA; FT. WORTH, TEXAS; HOUSTON, TEXAS; ODESSA, TEXAS; CASPER, WYOMING; CALGARY, ALBERTA. *Foreign Sales:* NEW YORK CITY, NEW YORK; STOCKHOLM, SWEDEN; BUENOS AIRES, ARGENTINA; MONTREAL, QUEBEC.

Typical Physical Properties of ATTAPULGUS FULLERS EARTHS

Chemical Analysis:

SiO_2	67.5%
Al_2O_3	12.8%
Fe_2O_3	4.5%
MgO	11.7%
CaO	1.6%
K_2O	0.76%
Na_2O	0.10%
Undetermined	1.04%

True Specific Heats:

	Mean Temp. °F.	Sp. Ht.
Dry Clay, 19.4% V.M.	150	0.16
Activated at 450° F.	200	0.24
	300	0.30
	400	0.35
Activated at 900° F.	300	0.22
	500	0.27
	700	0.31

Heat of Wetting:

	cal./g. (Activation Temp.-500°F.)
Water	23.17
Benzene	4.27

pH of Water Extract:

Activation Temp.	pH of Extract
650°F.	7.3
900°F.	8.1

True Density, Surface Area and Volatile Material vs. Activation Temp.

Activation Temp. °F.	D. True g./cc.	Surface Area $M^2/g.$	V.M. %
220	2.47	115	11.5
400	2.59	126	9.2
500	2.67	137	8.1
600	2.68	137	6.8
700	2.68	137	6.0
800	2.65	136	4.6
900	2.65	136	3.2
1100	2.66	134	1.5
1300	2.66	134	.9
1400	2.67	81	—

Heat Stability:

Treatment	Surface Area $M^2/g.$
After 1 hr. at 1100°F.	134
After 12 hrs. at 1100°F.	124
After 25 hrs. at 1100°F.	116
After 50 hrs. at 1100°F.	114
After 100 hrs. at 1100°F.	114

Attapulgus Fullers Earth

There's one *sure* way to get high yields of finish-refined petroleum products displaying specification color, odor, taste, stability and demulsibility—*percolation through Attapulgus Fullers Earth.* And that applies across the board—from light distillates through the specialty-oil and lube-oil ranges to the heavy residuals, waxes and petrolatums.

This naturally active clay is highly selective in its adsorptive action. Attapulgus Fullers Earth is low in initial cost, and the fact it retains high refining efficiency through repeated regenerations makes it still more economical. So, lower costs are coupled with higher yields. Finally, our extensive clay deposits and unexcelled plant facilities assure users a constant, *uniform* operating supply.

From these facts—and data given in the tables of properties—why not evaluate Attapulgus Fullers Earth as the ideal adsorbent in your filtering operation? Draw on the experience and authoritative knowledge of our engineers . . . they'll be glad to discuss all phases of application.

ATTAPULGUS CLAY COMPANY

DEPT. V, WEST WASHINGTON SQUARE · PHILADELPHIA 5, PA.

Are you too rich

to care about savings like these?

Here are 8 important savings that are yours when you join your piping with Dresser Couplings. Can you afford to pass them by?

1. SAVE MANPOWER. Any workman can assemble the standard Dresser parts on plain-end pipe, using only a wrench.

2. SAVE JOINING TIME. Dressers join pipe fast. For example: 12 minutes for an 8″ joint.

3. SAVE DELAYS. You can lay Dresser-coupled lines day or night, rain or shine, even under water.

4. SAVE REPAIRS. Expansion, contraction, vibration, ground movement absorbed by Dressers. These joints stay tight for the life of the pipe line.

5. SAVE PIPE FITTING. When pipe ends do not meet or pipe is offset, Dressers make a tight joint. Exact pipe lengths and alignment unnecessary.

6. SAVE ON RELOCATING LINES. Temporary lines quickly torn down and relaid, using the same Dresser Couplings. No preparing of old pipe-ends.

7. SAVE SPECIAL SECTIONS. Dresser flexibility permits curves and grades to be made with straight pipe.

8. SAVE HAZARDS. Both the Dresser joint and the wrench that installs it are entirely mechanical—no danger from open flames or sparks.

To get these savings and many other advantages, contact Dresser in Houston, Texas, or Bradford, Pennsylvania. Or see your oilfield supply store.

★ ★ ★

QUICK REPAIRS TO LEAKING PIPE

Breaks, splits and holes in pipe are easily repaired with Dresser saddles, clamps and sleeves. Get a supply from your oilfield supply store . . . have the jump on emergencies.

DRESSER

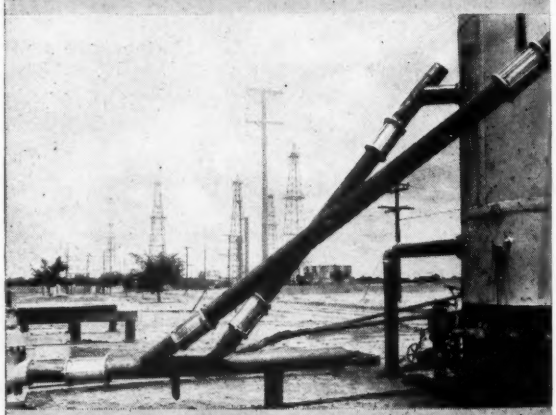
COUPLINGS and Repair Products

Dresser Manufacturing Div., 59 Fisher Ave. Bradford, Pa.
Houston Warehouse, 1121 Rothwell St., Houston, Texas

ONE OF THE DRESSER INDUSTRIES

Dresser Style 38 Couplings make trouble-free transmission lines. "10,000 Dressers without a single leak," says one Texas oil line manager.

Gathering lines quickly laid with Dressers, regardless of weather or darkness. Easily relocated when necessary.



Well and tank connections are made easier with Dresser Style 40 Couplings (long sleeves). They're tight and flexible, even where pipe-ends don't meet.

WICKES

PACKAGED-POWER

TYPE-A STEAM GENERATORS

Wickes Package Type-A Steam Generators are compactly designed for immediate installation with the *least possible installation problems* and disruption of production schedules. Designed to conserve headroom and floor space, Type-A Steam Generators are steel-encased package type units with casing, baffles, refractories, pressure parts, burners and floor all assembled. Engineered for pressures up to 850 psi, with sustained steam production of 20 to 275 nominal HP, producing up to 35,000 lbs. steam per hour, the Wickes Type-A Water Tube Steam Generator is a quick steamer, *requiring minimum maintenance and operating attention.* Consult Wickes first. We are completely equipped to design and build boilers to specific requirements.

RECOGNIZED QUALITY SINCE 1854

THE WICKES BOILER CO.
DIVISION OF THE WICKES CORPORATION
SAGINAW, MICHIGAN

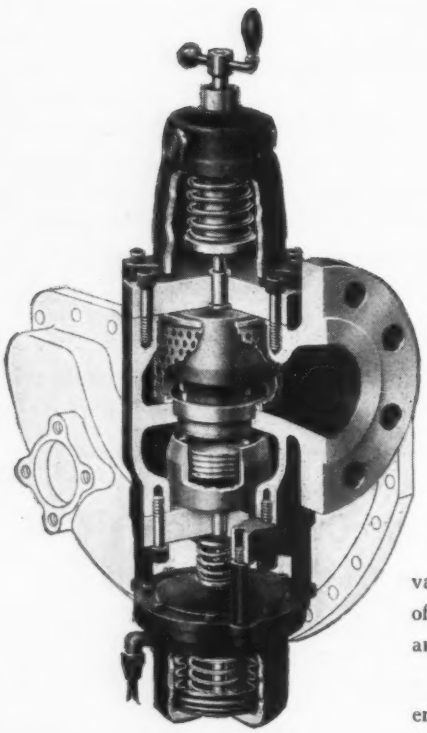
SALES OFFICES: Atlanta, Boston, Charlotte, N. C., Chicago, Cincinnati, Denver, Detroit, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York City, Pittsburgh, San Francisco, San Jose, Seattle, St. Louis, Tulsa, Mexico City, Buenos Aires.

THE new G-E standard mechanical-drive turbine—the Type DP—is a machine designed by turbine *users*. This new design was undertaken after an exhaustive survey, covering hundreds of turbine users, indicated the features *you* rated most desirable.

Formerly most of these features were obtainable at a price addition in a "special" machine. Now, as a result of superior design and greater standardization, we offer these special features as standard equipment —at no extra cost. This, we believe, makes the new Type DP the greatest value in small turbine history!

NEW

TURBINE OFFERS AT NO EXTRA



FOR THE FULL STORY

If you have steam available, these *new* turbines can work profitably for you. G-E sales engineers and turbine specialists will be glad to show you how your equipment can benefit from the features of G-E turbine drive. And, their wide experience is at your disposal.

For full information please contact the nearest G-E Apparatus Sales Office. Or, write today for GEA-4955, a fully illustrated, 20-page descriptive bulletin. Apparatus Department, General Electric Company, Schenectady 5, N. Y.

For many applications the combined trip-throttle valve—an exclusive G-E feature—makes a separate shut-off valve unnecessary, saves you the cost of purchasing an extra valve.

The trip-throttle valve and the governing valve are an entirely new balanced reaction design, requiring very little force to operate. No soft packings are used.

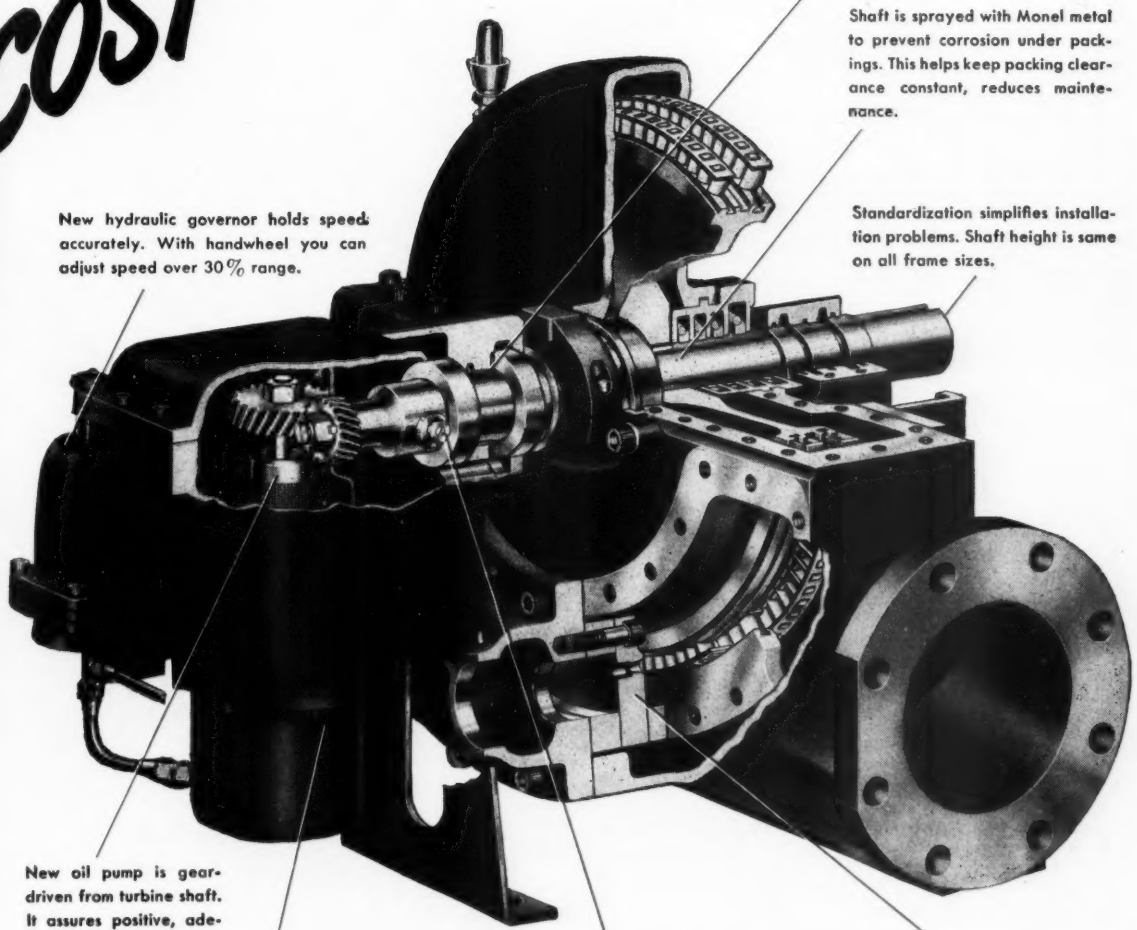
YOU SPECIAL FEATURES COST

New solid-backed bearings wear better, last longer. Thrust surfaces accurately position rotor, prevent misalignment troubles.

Shaft is sprayed with Monel metal to prevent corrosion under packings. This helps keep packing clearance constant, reduces maintenance.

New hydraulic governor holds speed accurately. With handwheel you can adjust speed over 30% range.

Standardization simplifies installation problems. Shaft height is same on all frame sizes.



New oil pump is gear-driven from turbine shaft. It assures positive, adequate lubrication.

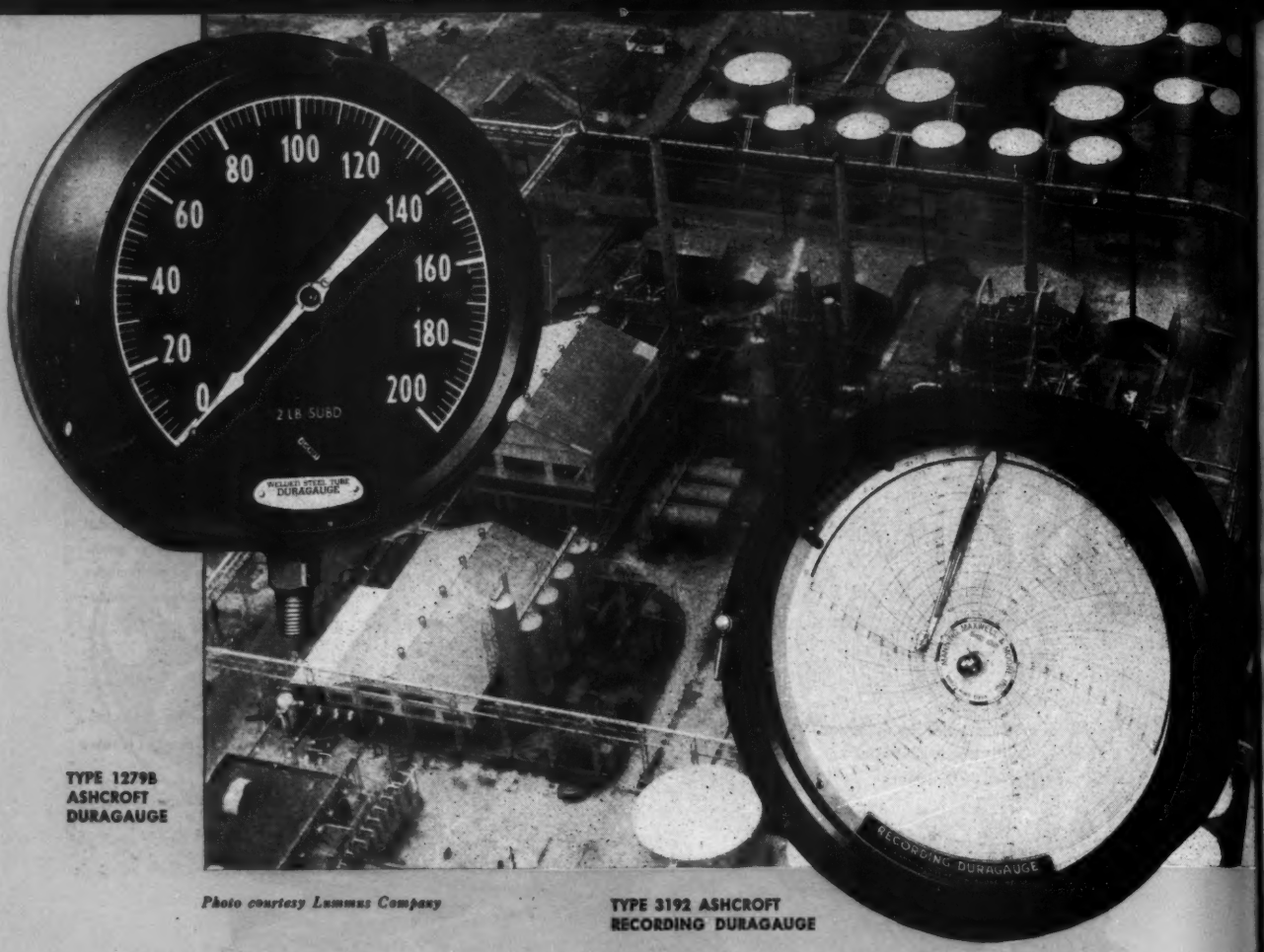
New oil cooler assures positive cooling of lubricating oil, reduces chances of bearing failure. Cooler is readily accessible, easily removed.

New nonsparking emergency governor assures positive overspeed protection. It is totally enclosed in an oil atmosphere, thus not subject to rusting or sticking.

Nozzle plate is made of special steel to resist corrosion and erosion. Thus high efficiency of your turbine will be maintained.

GENERAL ELECTRIC

252-27



TYPE 1279B ASHCROFT DURAGAUGE

Photo courtesy Lummus Company

TYPE 3192 ASHCROFT RECORDING DURAGAUGE

Protection of a refinery depends upon accurate and reliable gauges

"OILWELL" stocks the Ashcroft Duragauge because it has proven itself to be the standard pressure gauge for industry when durability, accuracy and highest quality are desired.

Accuracy is guaranteed to within one half of one percent of the dial graduation over the entire scale on a full 270° dial arc. Durability has been proven during the 96 years that Ashcroft has produced top-quality gauges.

"Oilwell" Stores maintain complete stocks of Ashcroft gauges for both conventional and specialized conditions. They can be supplied with bronze, drawn alloy steel or stainless steel Bourdon tubes depending on whether service conditions are mild or corrosive.

OIL WELL SUPPLY COMPANY · USS · "OILWELL" · UNITED STATES STEEL

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

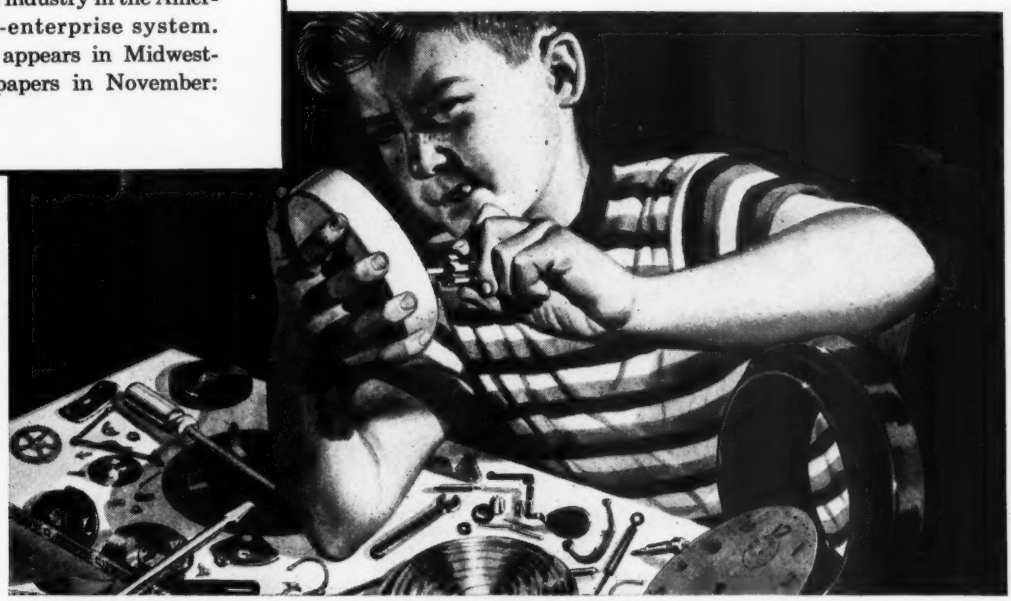
Executive Office—Dallas, Texas
Export Division Office—
30 Rockefeller Plaza
New York 20, N. Y.

Division Offices—Casper, Wyoming
Columbus, Ohio . . . Dallas, Texas
Houston, Texas . . . Tulsa, Oklahoma
Los Angeles, California

UNITED STATES STEEL

"OILWELL"

● With institutional advertisements like this, we are helping the public to understand the role of our company and the petroleum industry in the American free-enterprise system. This one appears in Midwestern newspapers in November:



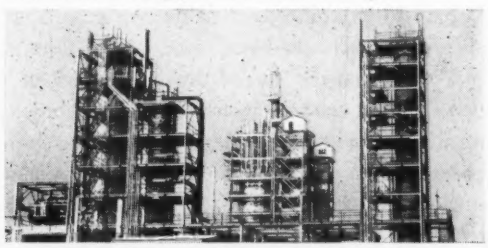
What makes it tick?

You can't expect a clock to work if you take it apart. The springs and wheels must all work together to make it tick. Likewise, the "springs and wheels" within our organization must all work together to bring you and the nation the petroleum products you need so urgently.

1. WORKING TOGETHER are these men and the more than 46,000 other employees of this company and its subsidiary companies. They are breaking all records for the production and sale of crude oil and finished products. Last year their wages and benefits averaged over $4,000 each—also a record. Each one of them is backed by an average investment of $25,000 in tools and equipment.

2. NINETY-SEVEN THOUSAND stockholders—more people than it takes to fill the giant University of Michigan stadium at Ann Arbor—own Standard Oil. Money provided by these owners creates jobs and the capacity to produce. No one man or woman among them owns as much as 1% of the stock. Of the institutional owners, which include 167 colleges, no one owns as much as 5%.

3. WE ALL DEPEND on the thousands of independent service station operators and other distributors who handle our products. Also important are the suppliers from whom we buy everything from crude oil, steel pipe and tank trucks to calculating machines, stencils and typewriter ribbons. And of course, we and the people who use our products depend on each other.



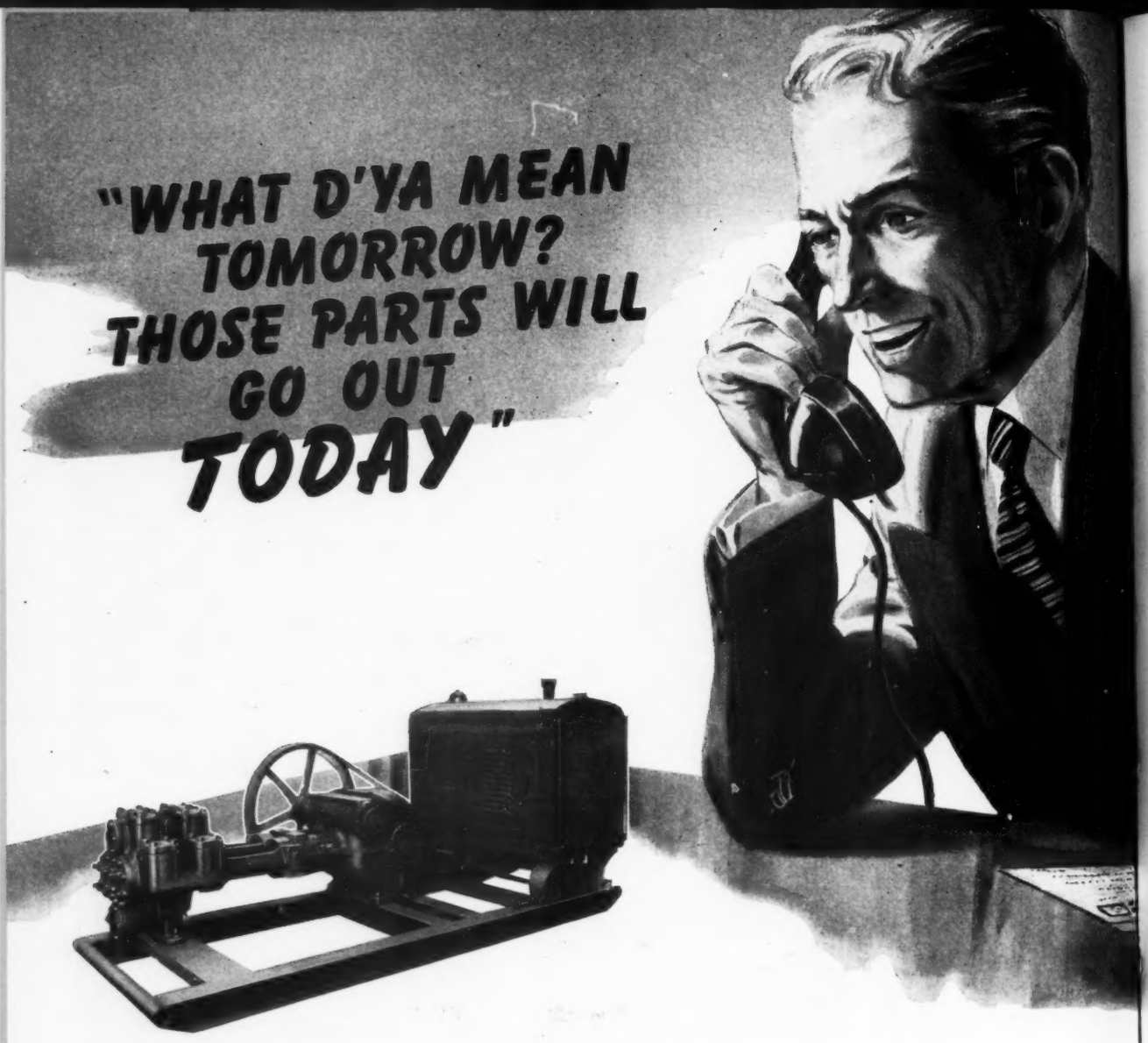
4. AT REFINERIES like the one above, we are working harder than ever to help meet your huge demand. Last year, in part by borrowing and use of earnings, we spent over twice our net profit for new facilities to increase output. This year, again, the thousands of people who make Standard Oil tick are working together, to bring you still more of the petroleum products you want.

Standard Oil Company

(INDIANA)

STANDARD

STANDARD SERVICE



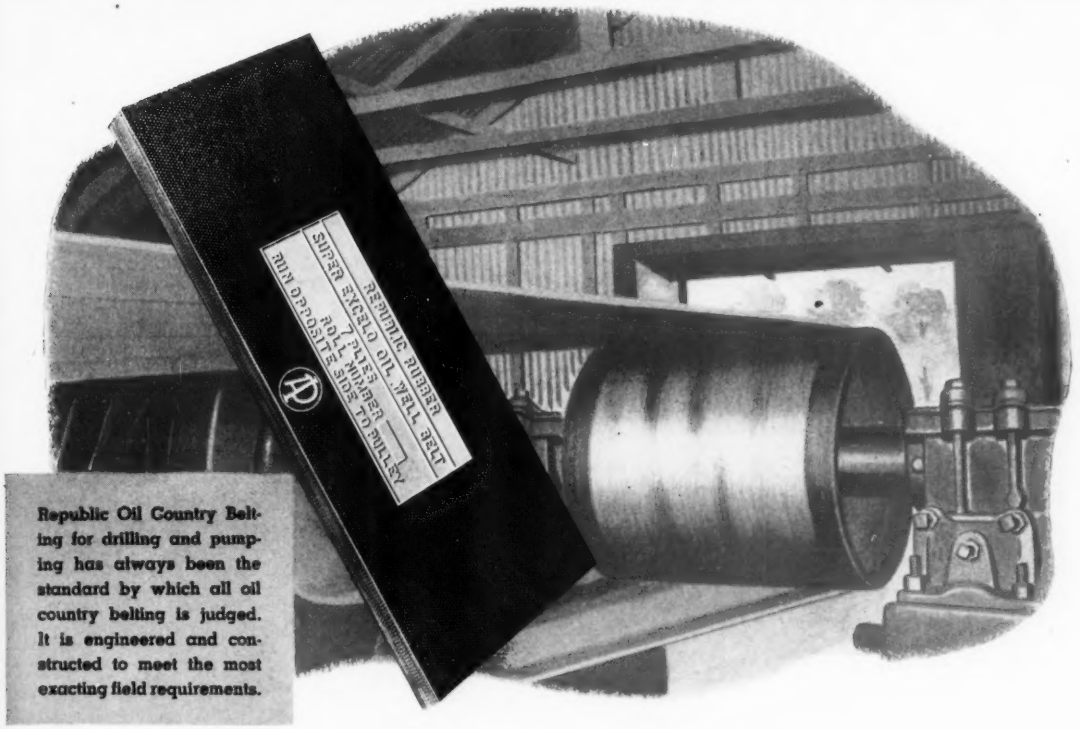
RUSH SHIPMENT IS STANDARD PRACTICE IN THE GASO PARTS DEPARTMENT

It pays to look ahead when buying pumps. The sturdiest specimens—yes, even Gaso Pumps—may some day be forced down by wear of or damage to a part. At Gaso every parts order is a call for emergency action. Precision-machined parts are selected from carefully maintained stocks, checked against complete records and rushed by quickest means to destination. Replacement is speeded, shutdown time reduced. Another reason why you get more for your money when you specify Gaso Pumps.

GASO PUMP & BURNER MFG. CO.
902 EAST FIRST ST., TULSA, OKLA.
Export Office: 149 Broadway, New York
Shreveport and Odessa: W. L. SOMNER CO.
Los Angeles: PRODUCTION EQUIPMENT CO., Inc., 651 E. Gage Ave.

GASO PUMPS
for every oil industry need

A Distributor serves you Best



Republic Oil Country Belting for drilling and pumping has always been the standard by which all oil country belting is judged. It is engineered and constructed to meet the most exacting field requirements.

Careful *"Choosing"* by Republic Rubber Distributors *helps you*, Mr. Buyer

2 *Quality*

POINT NUMBER TWO IN REPUBLIC'S FIVE POINT POLICY

A quality of product uniformly good and capable of delivering service results that should reasonably be expected.

Your distributor of industrial supplies is vitally conscious of the fact that he with his manufacturers are responsible for the products he sells. He chooses with care not only the products upon which he can rely but also the manufacturers upon which he can depend. For these reasons, Republic Rubber Division is the favorite source of many distributors of industrial supplies.

Thus, your distributor becomes a good source of supply. It will pay you to use his "selected" inventory items.

A QUARTER CENTURY OF PROGRESS

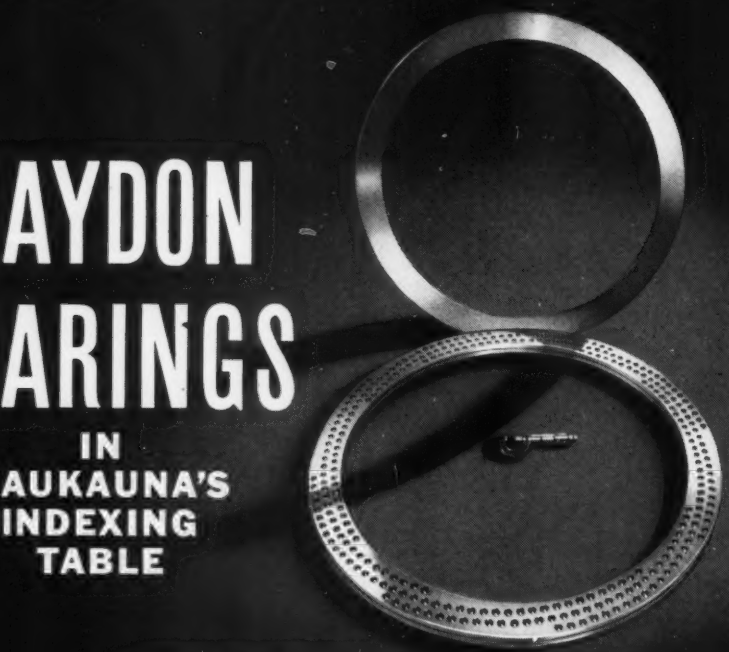
MECHANICAL RUBBER GOODS BY

REPUBLIC RUBBER DIVISION

REPUBLIC RUBBER DIVISION
LEE RUBBER & TIRE CORPORATION . . . YOUNGSTOWN, OHIO
Lee DeLuxe Tires & Tubes, Conshohocken, Pa.

KAYDON BEARINGS

IN KAUKAUNA'S INDEXING TABLE



KAYDON FLAT RACE BALL THRUST BEARING, 24.000" x 28.000" x 1.000", RACES .3125" THICK—HELD TO .001 parallelism.

As builders of precision metalworking machines, Kaukauna Machine Corporation, Kaukauna, Wisconsin, engineered this 2¼ ton Indexing Table to support heavy work pieces, without deflection, for machine tools, and for inspection and layout work.

The center of the main bed of this table is a 36" diameter indexing platen. Support of this platen demands an extremely large, rugged, precision bearing of big capacity.

Kaukauna engineers found **KAYDON** Bearings met their requirements, just as many other designers of heavy-duty machinery have found **KAYDON** Bearings improve ponderous oil field equipment, huge grinders, steel mill and paper mill machines, road-building units, excavators, hoists, bending machines and other heavy duty machines.

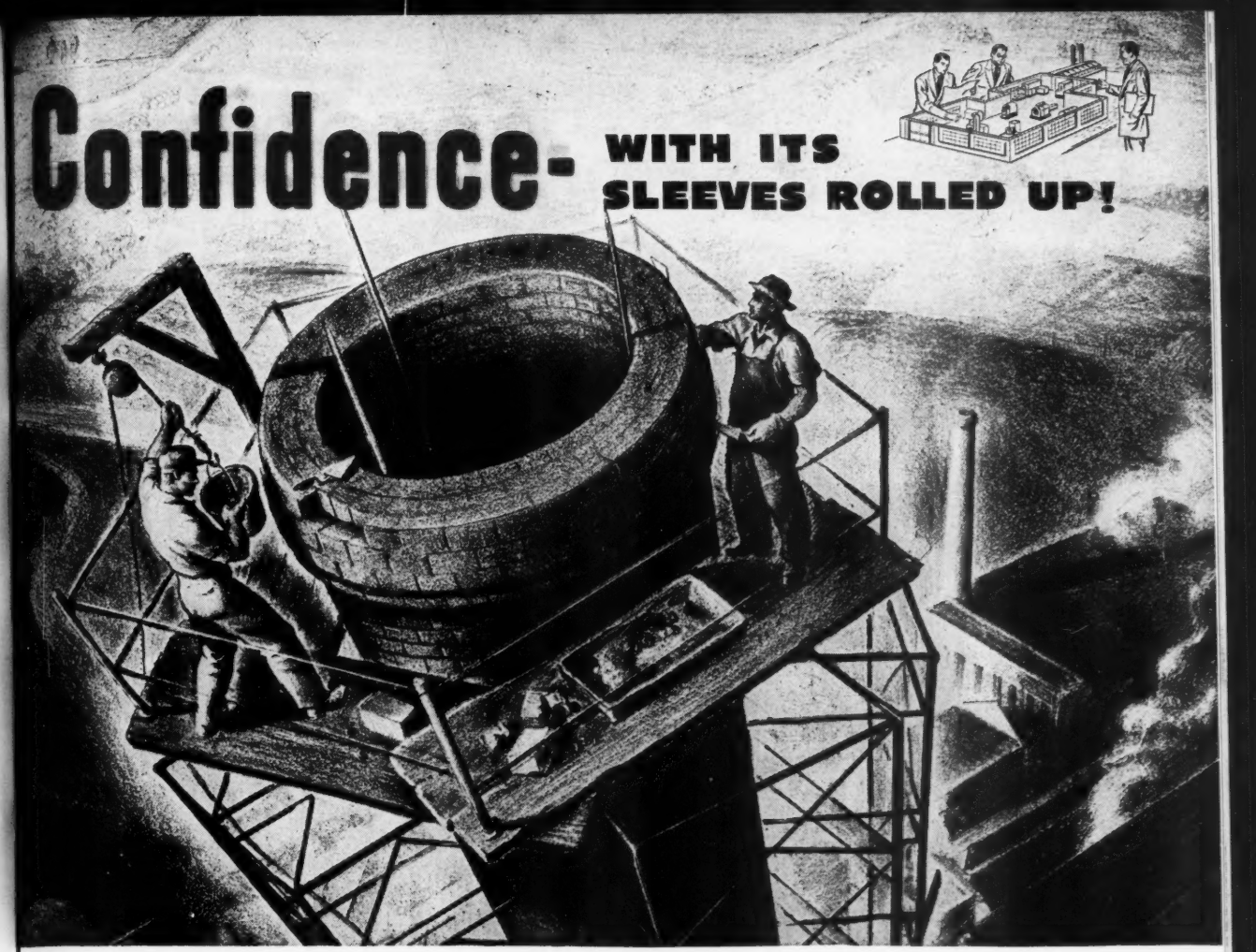
Contact **KAYDON** for bearing cooperation.

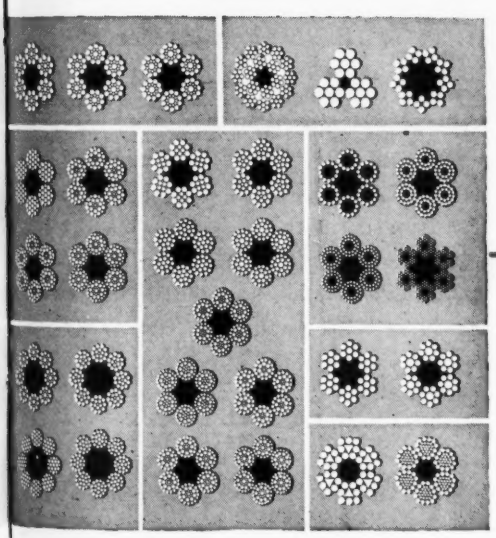
KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

Confidence- WITH ITS SLEEVES ROLLED UP!





STRAIGHT AND STALWART, every factory stack is a towering symbol of man's faith in the future... industry's confidence in its ability to create and to expand production for better living and a richer world.

With confidence like that, Roebling has pioneered in developing and making an extraordinary range of products indispensable to industry. And the confidence that its products and engineering skill have earned in every industrial field is one of Roebling's most valued assets. Every Roebling employee is striving to safeguard that confidence by making products and rendering services that are of maximum utility to you.

YOU CAN'T GO WRONG WITH THE RIGHT WIRE ROPE

EVERY TYPE of Roebling Wire Rope is right for certain service. But that's not enough... the important thing is that you choose the one rope that's *right* for your own job... the rope with the right balance of strength, flexibility, fatigue and abrasion resistance to give real economy over a long period of use.

Your Roebling Field Man will gladly study your requirements, and you can have full confidence that the rope he recommends will give you top returns per dollar. Whatever type it is, preformed or non-preformed, it will have behind it Roebling's unequalled experience in research, development and manufacturing the finest wire products that can be made.

Call or wire the nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY
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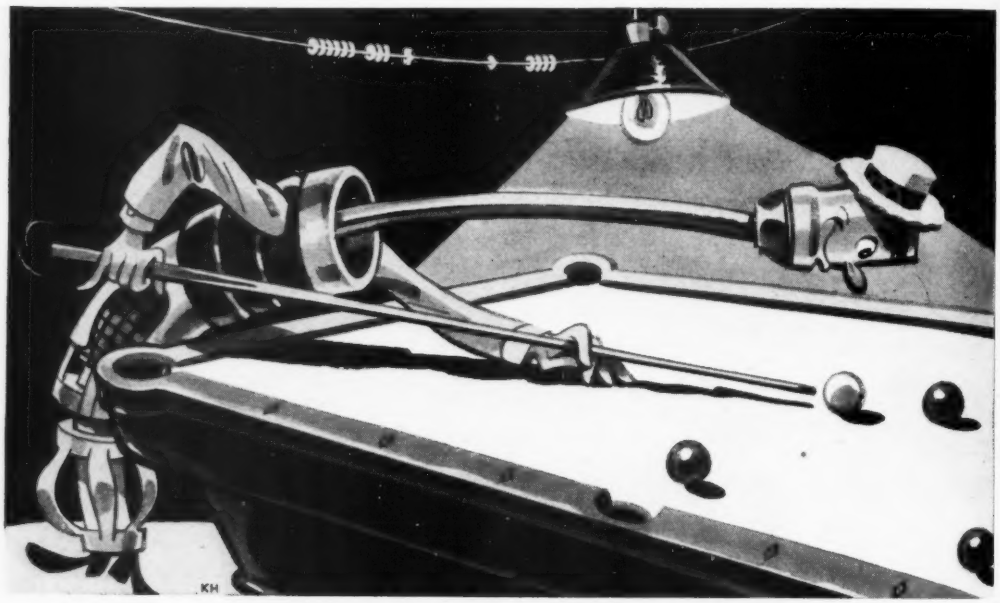
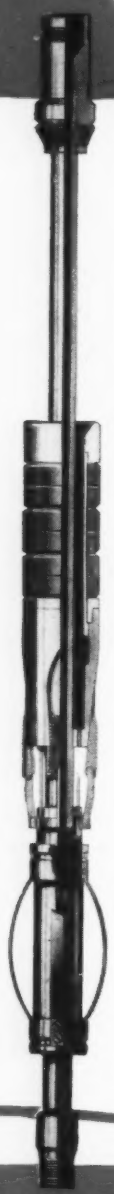
★ *WIRE ROPE AND STRAND* ★ *FITTINGS* ★ *SLINGS* ★ *SUSPENSION BRIDGES AND CABLES* ★ *AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS* ★ *AERIAL WIRE ROPE SYSTEMS* ★ *ELECTRICAL WIRE AND CABLE* ★ *SKI LIFTS* ★ *HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL* ★ *SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH* ★ *LAWN MOWERS*

When a Long-Stroke Valve Is Necessary...





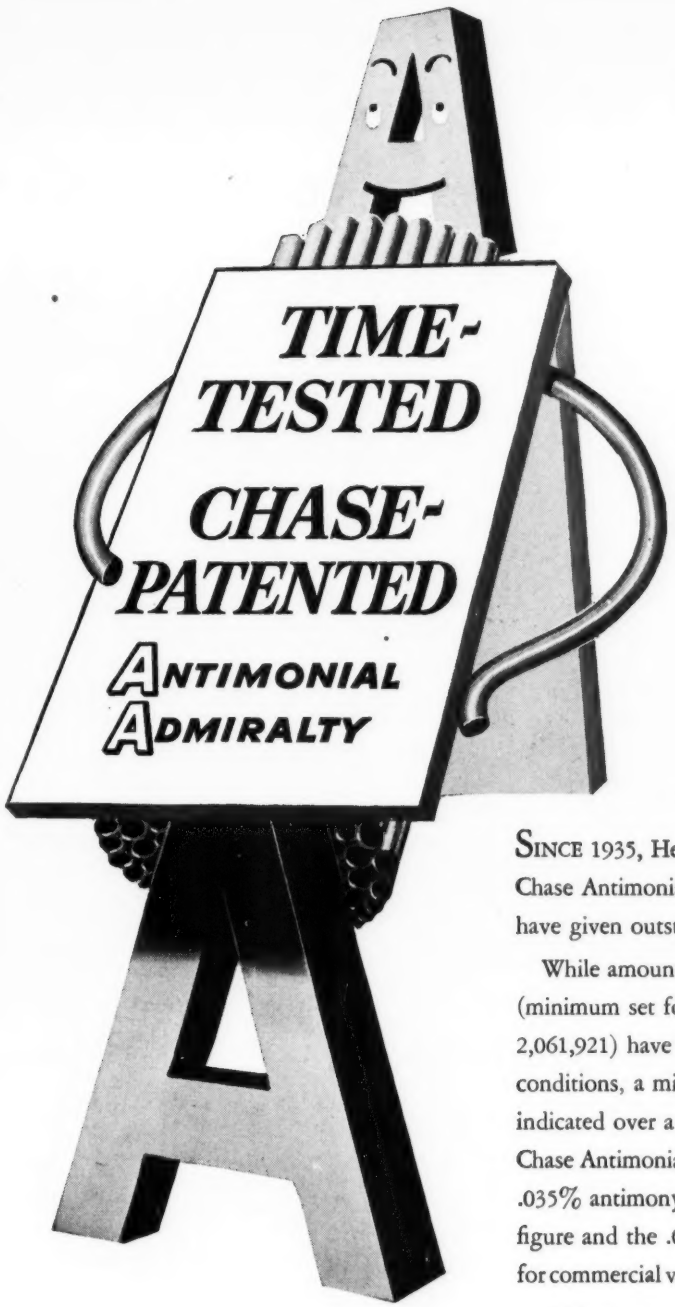
... as in deep wells, when tubing stretch is considerable, Lane-Wells BOCL Packer gives the kind of performance that brings pleased smiles to the operator's face. BOCL's long-stroke valve—a full 30 inches—gives perfect control without danger of unsetting the packer when picking up the tubing. You can count on the BOCL to pack off completely when you set it, to release freely when you pull it, and to give you long service. In addition to its long-stroke value it has all the proved Lane-Wells Packer features—Flopak Valve Seal, Floseal Packing Unit, Dovetailed Slips with cross-cut wickers, generous by-pass area for fast running in fluid. Ask your Lane-Wells representative to show you how all these features add up to better packer performance for you.

LANE TECHNICAL OILFIELD SERVICES WELLS

for Packers

General Offices, Export Offices and Plant
5610 S. Soto St., Los Angeles 11, Calif.

24 HOUR SERVICE • 49 BRANCHES



CHASE

SINCE 1935, Heat Exchanger Tubes made of Chase Antimonial Admiralty (a patented alloy) have given outstanding resistance to dezincification.

While amounts of antimony as low as .007% (minimum set forth in Chase Patent No. 2,061,921) have been satisfactory under mild conditions, a minimum of about .015% is indicated over a wide range of applications. Chase Antimonial Admiralty contains nominally .035% antimony. The difference between this figure and the .015% is the Chase allowance for commercial variation sometimes encountered.

With Chase Antimonial Admiralty, you obtain a strong safeguard against dezincification at no extra cost! Write or phone your nearest Chase Warehouse or Sales Office, for additional information.

Special stocks of ANTIMONIAL ADMIRALTY Condenser Tubes in Chase Warehouses: BALTIMORE, NEW ORLEANS LOS ANGELES, SAN FRANCISCO
also carried by—
Vinson Supply Co., Tulsa
Standard Brass & Mfg. Co., Houston

Chase

the Nation's Headquarters for
BRASS & COPPER

WATERBURY 91, CONNECTICUT — SUBSIDIARY OF KENNECOTT COPPER CORPORATION

THIS IS THE CHASE NETWORK . . . *handiest way to buy brass*

ALBANY† ATLANTA BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON† INDIANAPOLIS KANSAS CITY, MO. LOS ANGELES MILWAUKEE MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER† SAN FRANCISCO SEATTLE ST. LOUIS WATERBURY (†Indicates Sales Office Only)

WHERE PRESSURE PLAYS A PART

Where petroleum products must be stored under the higher pressures, Graver spheres or bullet-shaped vessels are proving their value to refineries, marketing facilities and processing plants everywhere.

Available in a full range of capacities and working pressures, Graver pressure vessels are built in strict compliance with all codes which apply and according to the latest techniques for the manufacture of either shop built or field erected tanks. Where stress-relieving, x-raying or radiographing is necessary, Graver maintains the latest in modern facilities to efficiently handle each specific requirement.

It's this close attention to details together with the most complete manufacturing facilities... backed by over three-quarters of a century of experience in steel plate fabricating... that makes Graver pressure vessels dependable.

Why not specify Graver the next time you plan petroleum storage facilities where pressure plays a part?

FABRICATED PLATE DIVISION

GRAVER TANK & MFG. CO., INC.

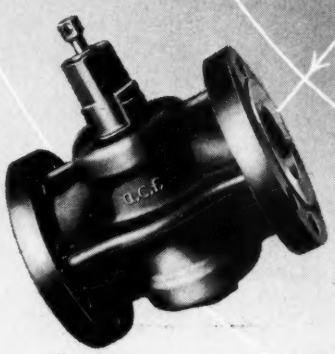
East Chicago, Indiana

Graver offers a complete service to the petroleum industry including Expansion Roof Tanks, Floating Roof Tanks and pressure vessels. In addition, Graver is prepared to furnish specialized steel plate work such as fractionating columns and class one vessels as well as stainless and alloy fabrication; water conditioning equipment of all types; and through the Graver Construction Co., is prepared to handle all types of petroleum and chemical construction work.

GRAVER

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

Why anything other than a Cylindrical Plug Valve?



It came into being with modern precision-ground fits... High pressure grease seal... Easy to turn... Always liquid tight.

CYLINDRICAL

a.c.f. FULL PIPE AREA PLUG VALVES

LUBRICATED

Representatives in more than 50 Principal Cities

Reference Catalog No. 4-OG of types and sizes available on request. Write A. C. F. Valve Corporation, 30 Church St., New York 8, N. Y.

Elephant ~~HORSE~~ POWER

FOR ROUGH GOING IN SWAMPY, MUDDY, SANDY "OFF HIGHWAY" COUNTRY

OSHKOSH ALL WHEEL DRIVE BOTH *Pulls* AND *Pushes*

Osh is proud of his elephant strength —of the elephant power that the all wheel drive of Oshkosh Trucks provides—pulling and pushing out of mud, soft dirt, sand . . . Hydraulic power steer makes steering easy in sand, soft dirt and mud . . . Oshkosh, like the elephant, never forgets to do the job when the going's tough.

Mid-Continent Representatives

GARDNER-PRICE CO.
Wright Bldg., Tulsa, Okla.

OSHKOSH MOTOR TRUCK, INC.
Oshkosh, Wisconsin

Jarecki was the *pioneer* oil field supply company, having been in business seven years when the Drake Well was brought in in 1859, and having furnished part of the equipment for that well.

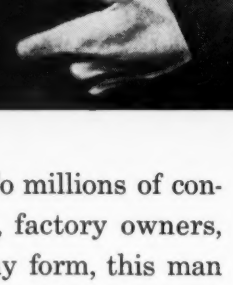
For 96 years the Jarecki business has been built on customer confidence . . . a confidence which has resulted from the quality of the products delivered and from our painstaking service. We guarantee that equipment purchased from us will be found of highest merit, in materials, construction, and field performance. . . Jarecki Manufacturing Company, Houston, Texas. Factory: Erie, Pa.

STORES: TEXAS—ABILENE, BORGER, CISCO, COLEMAN, CORPUS CHRISTI, DALLAS, EASTLAND, ELECTRA, GREGGTON, HOUSTON, KILGORE, ODESSA, PAMPA. OKLAHOMA—BARTLESVILLE, GUYMON, KIEFER, OKLAHOMA CITY, SEMINOLE, SHIDLER, TULSA. KANSAS—CHASE, EL DORADO, RUSSELL, WICHITA. NEW MEXICO—HOBBS, JAL. ILLINOIS—CARMI, CENTRALIA. OHIO—WOOSTER. PENNSYLVANIA—CLARENDON, PITTSBURGH.

MEN OF PETROLEUM..

SALESMAN... To millions of consumers, ranchers, factory owners, storekeepers—to everyone who uses petroleum in any form, this man *is* the petroleum industry. He represents years of scientific study and advancement...hundreds of invaluable products...millions of dollars in capital investment dedicated to better living through the petroleum industry. His advice saves money, saves time, saves automobiles or livestock or machinery. He studies individual problems...turns them over to a highly trained army of technical experts...returns with their solutions. He is everywhere . . . helping people use the multitude of human and technical benefits that flow from petroleum.

STANDARD OIL COMPANY OF CALIFORNIA



ALLIS-CHALMERS

"Certified" Service

A BREAKDOWN on this 39-year-old Allis-Chalmers fan motor crippled operations at the plant of an important midwest electric utility. Immediate repair was vital. The Chief Engineer called the nearest Allis-Chalmers Certified Service shop. They picked up the rotor and returned it ready for service in less than twenty-four hours.

This is the kind of emergency cooperation you can expect from every Allis-Chalmers Certified Service shop. On everyday repairs and maintenance too, your Allis-Chalmers Certified Service shop will give you prompt service on Allis-Chalmers motors, pumps and transformers, using factory approved methods and parts. Every Allis-Chalmers Certified Service shop has been selected for skilled, personal, careful workmanship, adequate equipment and *service mindedness.*

HOW TO FIND NEAREST SERVICE SHOP

Allis-Chalmers Certified Service shops are located in major industrial centers throughout the country. New shops are being appointed continuously and most smaller centers will soon be covered. To find the shop nearest you, call your closest Allis-Chalmers District Office. A 2543

MOTOR DELIVERIES GREATLY IMPROVED

Many types of Allis-Chalmers Motors are now in stock! Many other types are available on short delivery! For motors from 1 to 200 HP, check your nearest Allis-Chalmers Authorized Dealer. For motors larger than 200 HP, check with the nearest District Office. You may be able to get what you need sooner than you think.

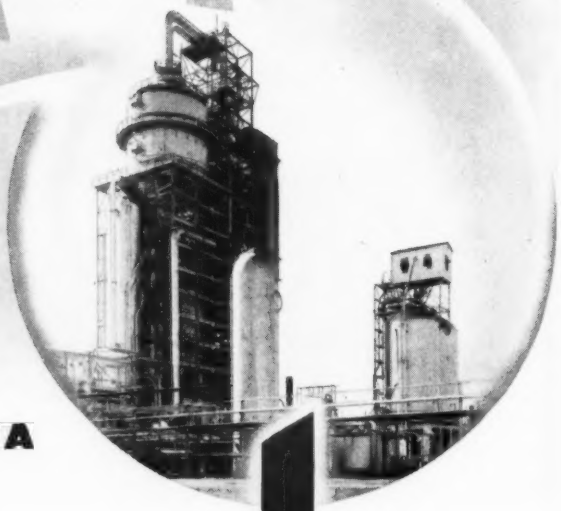
ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

DA-1

F-1 FINE GRIND
C-1 INTERMEDIATE GRIND
C-2 COARSE GRIND



DAVISON FLUID SYNTHETIC SILICA ALUMINA CRACKING CATALYST

Close laboratory control over the production of Davison fluid synthetic cracking catalyst assures a consistently high standard material offering peak production performance. Each day, DA-1 contributes to the production of over 5,000,000 gallons of gasoline.

Davison develops and produces special catalysts to individual requirements . . . and will cooperate with you in the development of a catalyst for your specific process. Write for information on—

DAVISON SYNTHETIC CATALYSTS

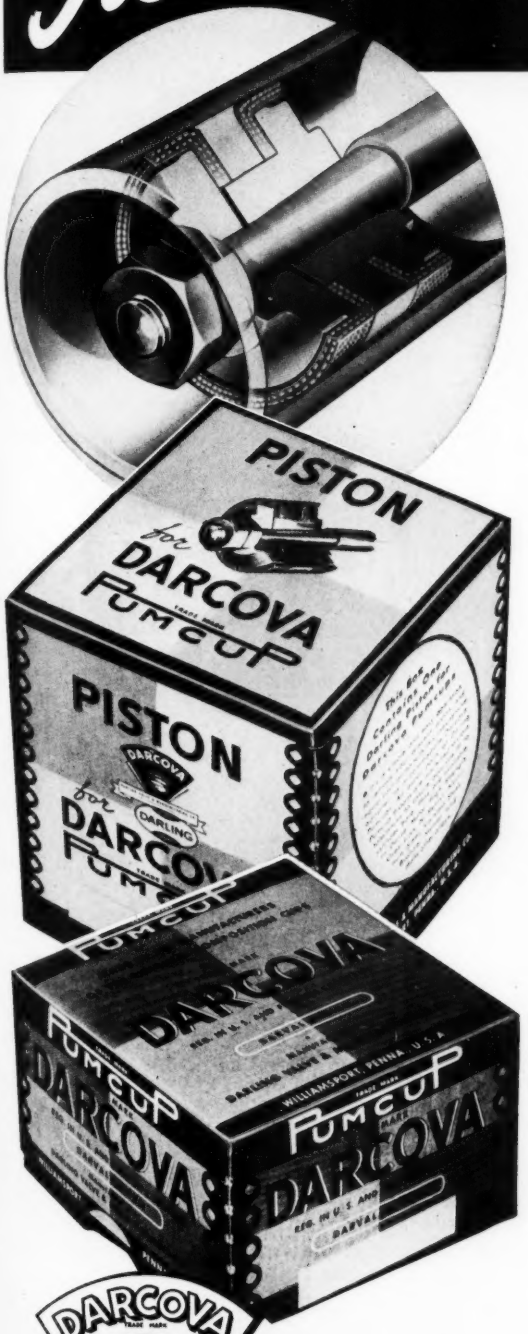
THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

BALTIMORE-3, MD.

It's Easy TO CHANGE TO DARCOVA

THE ORIGINAL COMPOSITION CUP



MOST engineers and operators in charge of reciprocating pumps are aware that Darcova Pumcups offer distinct advantages over piston packing of other types—that Pumcups last 5, 10, or even 100 times as long, that fluid slippage is all but eliminated, that efficiency doesn't decrease with Pumcup wear, that pump speed can be reduced and volume increased, that power is saved, and that downtime and maintenance expense are cut to a fraction.

But what many of these men are not aware of is the downright simplicity of changing over to Darcova Pumcups. It's easier than replacing with the old type packing.

To simplify the change-over, to prolong liner and pump life, Darling Pistons are recommended. They are carried in stock at all times, can be supplied in various metals and alloys for every industrial need.

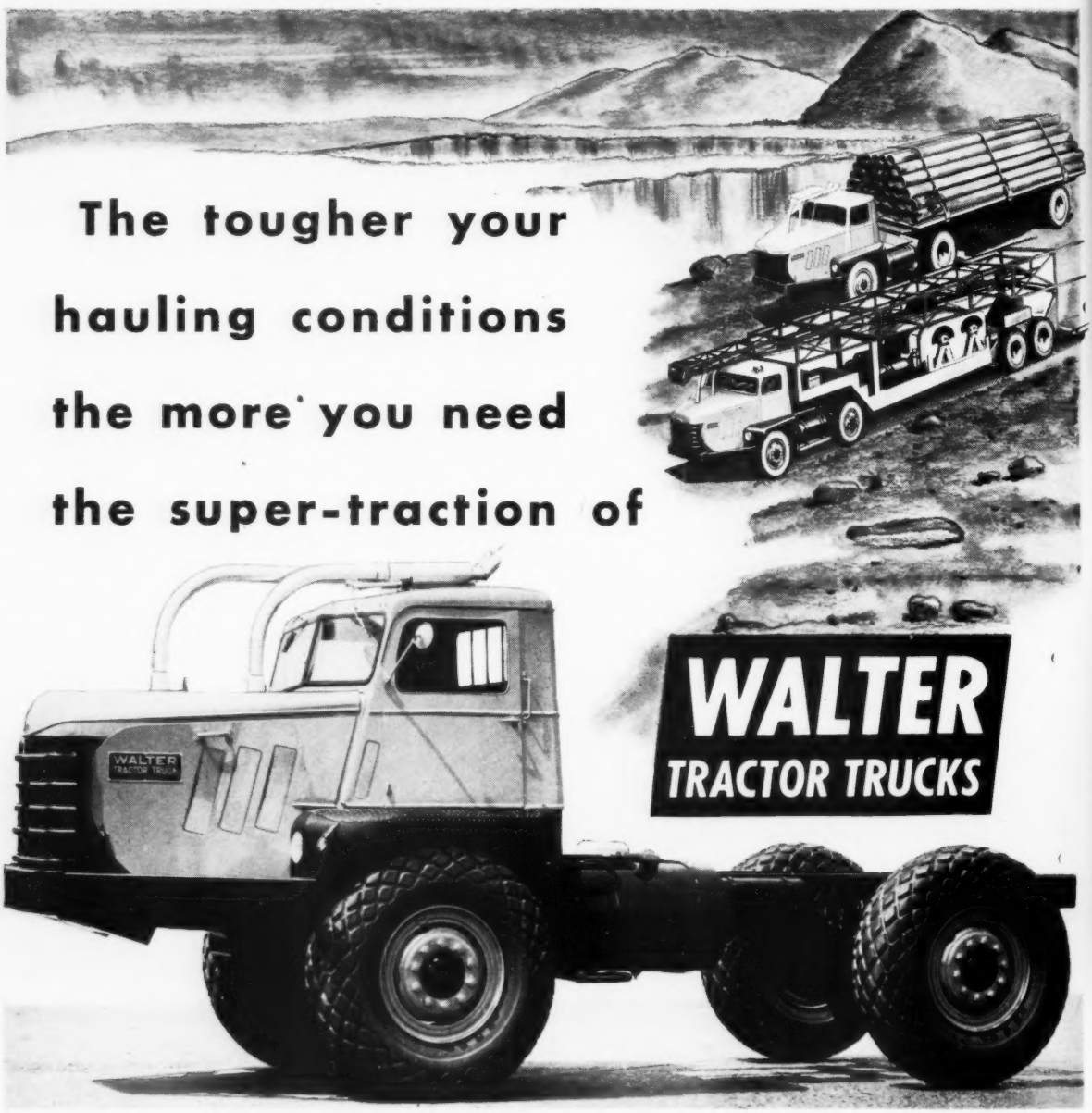
For a free bulletin containing complete information, write, or use the coupon below.

DARCOVA ®
THE ORIGINAL COMPOSITION CUP

DARLING VALVE & Manufacturing Co.
WILLIAMSPORT, PA.

Darling Valve & Mfg. Co., Williamsport 1, Pa.
Please send me the free bulletin checked below:
☐ No. 4401 Darcova Pumcups for reciprocating pumps.
☐ No. 4502 Darcova Pumcups for air or hydraulic mechanisms.

Name_____
Company_____
Address_____
City_____ State_____



WHAT are your two biggest problems in hauling heavy equipment to location? Unquestionably . . . bad weather and difficult running conditions that stop or slow down your trucks.

You can't change the weather or terrain, but you *can* change to Walter Tractor Trucks and overcome the problem. The tremendous power-plus-traction of Walter 4-Point Positive Drive hauls heavy loads unfailingly over sand, mud, soft dirt, ruts, slippery surfaces and steep grades. You have positive tractive effort in all four driving wheels, without the customary wheel-spinning which stalls conventional drives.

By removing the limitations in your hauling, Walter Tractor Trucks permit you to haul the biggest rigs, draw works and equipment to the most remote locations. You can set and keep your schedules, free of the repeated stoppages now caused by hauling failures.

Get the full story on the advanced design, rugged construction and remarkable hauling ability of Walter Tractor Trucks for heavy-duty off-the-highway work. Write today for detailed literature.

WALTER MOTOR TRUCK CO. • 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

Make ONE call and get it ALL from BOVAIRD SUPPLY C

Call on the supply company that can furnish the merchandise and service you need. Bovaird's complete line covers drilling, production, pipe line and refining equipment and supplies. Their experienced and energetic personnel lend their competent assistance to solve your problems.

"Buy From Bovaird"

SUPPLY BOVAIRD COMPANY

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TEXAS—Borger, Dallas, Odessa, Pampa

THE BOVAIRD SUPPLY CO.

GENERAL OFFICES: TULSA, OKLAHOMA

Pittsburgh Seamless Mechanical Tubing

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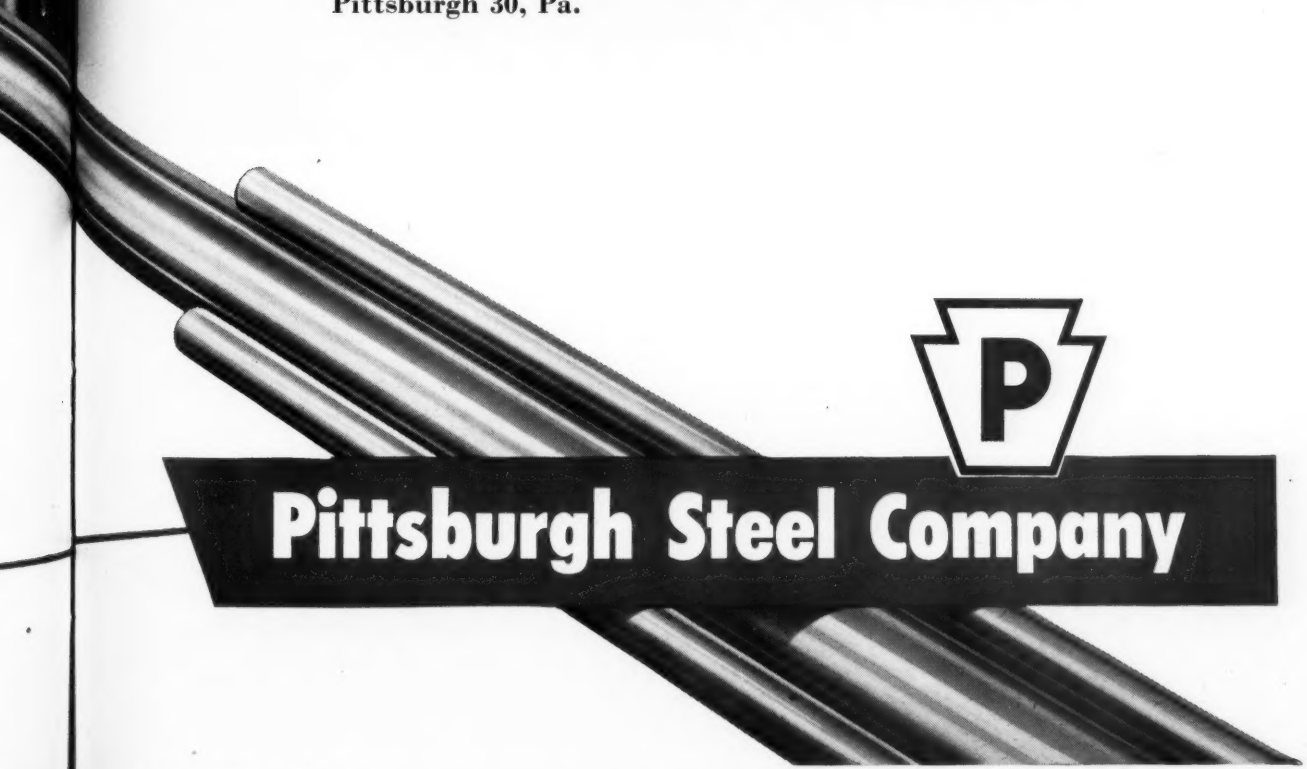

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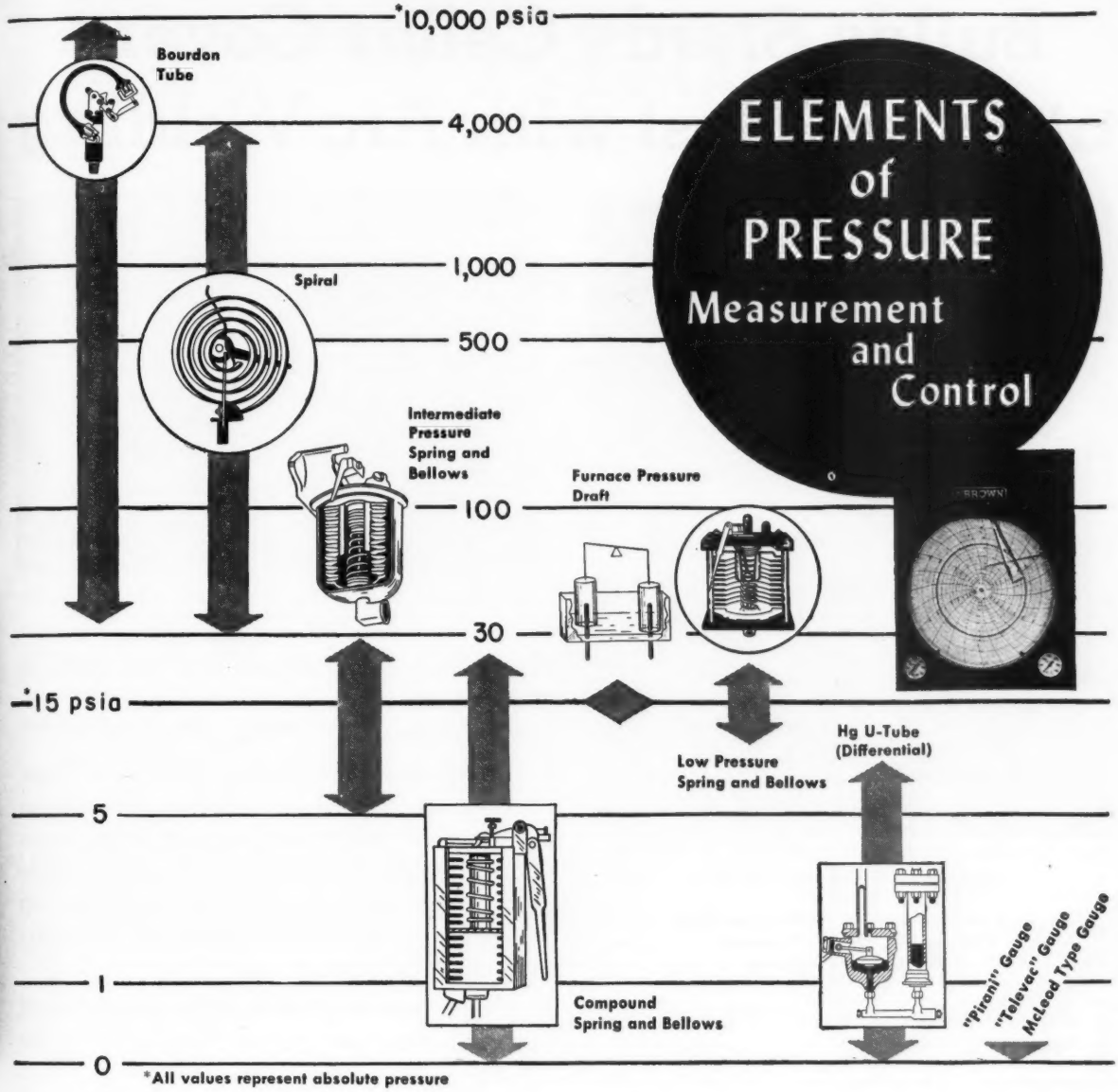

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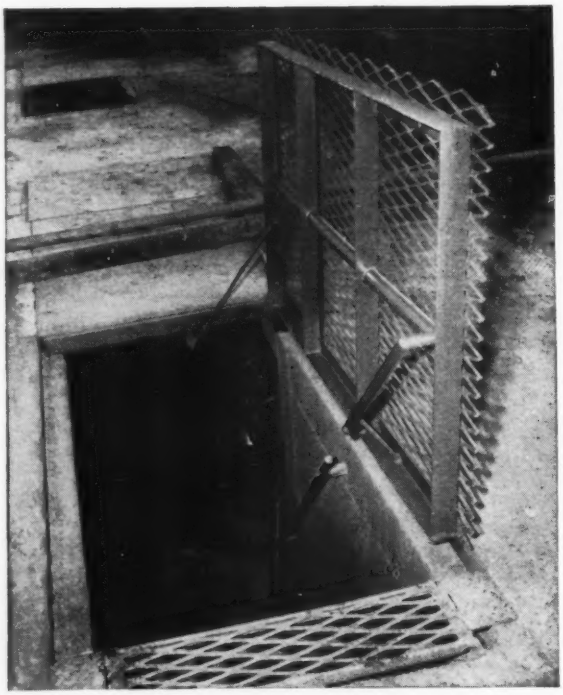

Fig. 1. All welded steel cellar cover in open position, showing counterbalance spring and safety latch mechanism.

By J. B. McCormick, Welding Engineer
The Lincoln Electric Company
Los Angeles, California

UNIQUE cellar covers of all welded steel construction afford easy access to the underground "Christmas trees" in the tideland fields at Long Beach, California. Each of 68 wells spaced 25 feet apart, now being drilled, will be equipped with underground "Christmas trees," thus enabling the shore area to be converted into a recreational park at a later date by the Long Beach Harbor Department.

The cellar covers are built from 3″ x 3″ angles flame cut to shape and welded as shown in Fig. 1, with 5/32″ diameter "Fleetweld 5" electrode, and using Engine-Driven Lincoln "Shield-Arc" welders. Pipe is used for cross bracing the frame and for building the handrail. The cover is equipped with a spring-type counterbalance to afford easy operation. A safety latch is also included to prevent accidental closing.

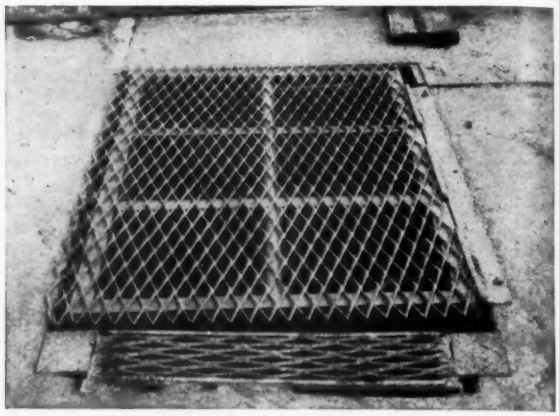

Fig. 2. Cellar cover in closed position showing hinges at right. Top covering is made from steel grating.

Fig. 2 shows the hinged cover in a closed position. Steel hinges at right are fillet welded to the cover frame and bolted to steel inserts in the concrete foundation. Steel grating, flame cut to size and welded to the frame for top covering, provides for ventilation to the underground cellar interior.

Other steel members such as the stairs and floor coverings are likewise fabricated at low cost with arc welding.

Fig. 3. Fabricating all welded steel covers with truck-mounted, engine-driven "Shield-Arc" D.C. welders.

The above is published by **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*
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JOURNALLY Speaking

Ball & Ball

THE picture in this column shows, left to right, (1) Max Ball, (2) crystal ball, (3) a wily swami, engaged in forecasting the future of the oil industry.

Max is in the act of transferring from director of the Oil and Gas Division to the private

life of a consultant. The crystal ball in private life is a goldfish bowl (which is probably an omen in itself). The swami in private life is Wiley Whisonant, genial confidential messenger to OGD and NPC and their predecessor PAW and PIWC, a capacity which has brought him in contact with all the top brass of Government and oil.

This was a gag at the farewell party the staff gave Max, but we can't think of any better combination for predicting what is going to happen in either Government or the oil industry.

The Wetter the Drier

HELP your wife with the housework and find out how to save your company several hundred bucks a day.

This, roughly speaking, was the experience of a pipeliner as described in an article in the engineering section of this issue. Seems his wife was using one of these new much advertised, household detergents and he noticed the dishes came out of the water wet all over evenly instead of with drops bunched in spots. Next morning he swiped a box from the kitchen and spread it on his pipe line with astonishing results.

The stuff makes the water wetter and this makes the pipe line drier, as explained in more technical language on page 100.

Cold Fact

REMEMBER back when synthetic rubber was hot news? You hardly ever hear of it any more. But it didn't, as many predicted, fade out of the picture when the war ended.

The cold fact is that the synthetic-rubber industry is quite vigorous, and is improving its products and processes right along. And among the new processes the hottest stuff is cold. This paradox is explained on page 70 of this issue.

Allure L'Amour, A.C.S.

IN reporting the establishment by the American Chemical Society of a $1,000 prize for achievement in petroleum chemistry, our refining page this week, in strict conformance with its readers' interest, fails to mention that A.C.S. is also offering a similar prize for improvements in perfume. Perhaps this will permit perfume manufacturers to catch up with the claims of their advertising copy which gives the impression that this commodity has already been perfected to the point where no male can possibly resist the allure of a scheming wearer.

Vicious Circle

MORE than one-fifth of all the steel produced since the end of the war, says the American Iron and Steel Institute, has gone into the manufacture of equipment which will consume oil, such as automobiles, oil burners, and diesel engines.

At the same time the oil industry is fighting to get more steel to produce more oil to fill these new demands.

Reminds us of the old crack about the ambition of Iowa farmers to raise more corn to feed more hogs to buy more land to raise more corn to feed more hogs to buy more land and so on ad infinitum.

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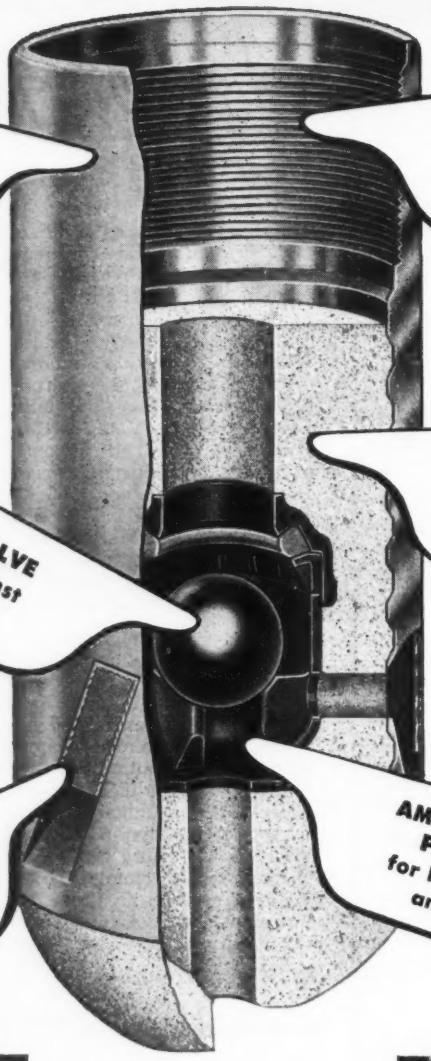

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In Seven Years

A BUSINESS analyst seeking information as to what had happened in several phases of our economy since Pearl Harbor caused us to assemble data which reflect in part the growth and changes that have taken place over the past 7 years within the oil industry. This period includes 45 months of war and 39 months of postwar.

In comparing operations now and then it is necessary to keep in mind the fact that the petroleum industry was in high gear on December 7, 1941. Operations had been expanded steadily for several months in anticipation of a possible emergency, and many activities were at all-time peaks as the year closed. Domestic crude-oil production had passed 4 million barrels daily and there was talk that this would have to be increased to 5 million barrels daily—with many skeptical as to whether this could be done.

As has been the case for several weeks, the crude-oil output of domestic fields averaged more than 5,600,000 bbl. daily last week, a gain of 36 per cent over the week that included Pearl Harbor. That comparison does not reveal one of the most interesting developments in regard to supply. Production of liquid hydrocarbons in this country now exceeds 6 million barrels daily because in addition to the crude oil there is an output of approximately 400,000 bbl. daily of natural gasoline and associated products.

This reflects a 7-year increase of 60 per cent in the production of these light hydrocarbons, a fact which is not fully evaluated in many statistical analyses of this industry. Aside from the normal growth paralleling the gains in crude-oil output, the application of conservation practices and the expansion in cycling have added to the production of these light products. From these in turn has come the increasingly important liquefied gas division of petroleum activities.

Drilling in late 1941 was near the industry's peak up to that time. It is now about 25 per cent greater. Of particular interest is the large increase in exploratory operations. Wildcat tests are being completed at the rate of 18 to 20 daily. While more than 80 per cent are listed as failures, the successful completions and the widespread development drilling account for the present record production and the satisfactory backlog of both oil and gas reserves.

In response to demands, refiners jumped their runs to stills to slightly over 4 million barrels daily in December 1941. Present operations are more than 40 per cent above that level. This has been accomplished despite the restrictions of war and subsequent limitations in equipment and materials.

Thus over-all the analyst's survey will show better than a one-third expansion in petroleum since 1941, a record not exceeded by any other major industrial enterprise.

Congress Committees Look Into Crude Prices and Oil Earnings

by Bertram F. Linz

INVESTIGATIONS already under way and suggested legislation being readied for introduction when the new Congress convenes in January promise to make oil again an outstanding subject for congressional discussion.

The subject of crude-oil prices is expected to come under scrutiny next week in the course of hearings before the joint economic committee headed by Sen. Ralph E. Flanders of Vermont. This group is beginning a study of corporate profits and the economic factors behind the current price structure.

Robert Dunlop, president of Sun Oil Co., and Eugene Holman, president of Standard Oil Co. (N. J.), are scheduled to appear December 15. While the Flanders committee is making a long-range economic study, the current situation in crude-oil prices is considered certain to enter the testimony.

Meanwhile this week two oil men appeared before the trade policies committee headed by Sen. Homer E. Capehart of Indiana to testify on how the oil industry may be affected by the campaign against basing-point price systems undertaken by the Federal Trade Commission as a result of the Supreme Court decision in the Cement Institute case. *(See pages 45 and 59 of this issue.)* These witnesses were Roland Rodman, president of Anderson-Pritchard Corp., Oklahoma City, and H. E. Milton of Milton Oil Co., St. Louis.

Tidelands Coming Up

Legislation affecting offshore oil operations is certain to be discussed early and often in the session. Last week President Truman made it known that he will again ask Congress for legislation authorizing federal administration of the California tidelands oil fields. He so stated in response to a question at the first press conference he has held since his election, but did not discuss his plans in detail.

On the heels of the President's statement that he would press the tidelands issue, the Department of Justice asked the Supreme Court to speed up the work of D. Lawrence Groner, special master, who plans to open hearings in California next month to cover a number of issues which the department contends are not pertinent to the purposes for which he was appointed.

In a petition filed with the court December 3, Solicitor General Philip Perlman said Groner's course would result in "protracted delays that would plainly be contrary to the public interest.

"Large amounts of petroleum are meanwhile being extracted and drained from the three areas designated by the United States, and it is important that the rights in these areas be adjudicated promptly," he added.

Perlman contended that the scope of Groner's authority is limited to determining the area to come under federal jurisdiction in the Santa Barbara Channel and seaward and south of San Pedro Bay, and asked the court to issue an order to that effect. California state authorities are asking also for adjudication of federal control in six other areas, Crescent City, Arcata-Humbolt Bays, Bodega-Tomales Bays, Monterey Bay, San Luis Obispo Bay, and Santa Monica Bay.

"The United States has identified three areas which call for adjudication; the state has not disagreed," Perlman told the court, "but it has cited six additional areas. It would be a relatively simple matter to determine, on the basis of undisputed facts, as to the activities in each of the areas, which of them call for present adjudication."

Thus, he added, the master's only duty is to report to the court what areas require adjudication and to suggest the procedure to be used. "These," he said, "are matters which can be explored by conferences with counsel, similar to the pretrial conference which has become familiar in the district courts."

Dual Prices for Mid-Continent Crude Continue Unchanged During Past Week

THE impasse over the price of crude oil in the Mid-Continent and Rocky Mountain region remained unchanged during the past week, in spite of a flood of rumors as to what might happen.

No changes in prices have been posted since November 24 when Sinclair Prairie Oil Co. and Sinclair Wyoming Oil Co. announced an increase of 35 cents per barrel in six states, thus meeting the price which Phillips Petroleum Co. had been posting since September 28. A number of relatively small purchasers have met the Phillips and Sinclair increases, but the major portion of the crude produced in the area is moving at the old prices. The high price is $3.00 per barrel for top-quality crude, as against the more generally prevailing price of $2.65.

Phillips and Sinclair have obtained a substantial amount of additional crude since posting their increases, but apparently the crude thus lost to other purchasers has not been sufficient to force others to meet the price. There are widespread reports that additional producers have notified purchasers that they will shift connections unless the higher price is met, and it is understood that in many cases the deadline for the shift passed early this week without forcing a price change.

The price of Zanesville Penn Grade crude was reduced 54 cents per barrel on November 16, and reports early this week were that a reduction of about this amount will soon be applied throughout the Penn Grade area. This is attributed to a reduction in prices of lubricating oils and an accumulation of lube-oil stocks.

Steel Agreements for Oil Industry May Be Extended

WASHINGTON. — Continuation of present voluntary agreements allocatcating steel for tanker construction and repair and for tank and oil-field production equipment for 6 to 7 months after expiration of Public Law 395 next February 28 was discussed December 8 in two public hearings conducted by the Office of Industry Cooperation.

Two proposals were discussed at the hearings, one providing for a 6-month continuance of the programs in the event the law is not continued, and the other extending them for 7 months if the legislation is reenacted. The purpose of the longer extension suggested by the OIC is to permit the agreements to run through the full third quarter of next year.

The programs provide for the allocation of 40,380 net tons of steel monthly for construction and repair of tankers and 16,530 net tons for tank and oil-field production equipment.

A number of amendments in the procedure to be followed under the agreements also were discussed at the hearings.

Texas Operators Gain Injunction To Prevent Gas-Field Shutdowns

HOUSTON.—With the granting of a permanent injunction to keep the Railroad Commission from enforcing its Heyser field shutdown order, the oil operators have won a major victory in their fight to prevent the closing down of 16 fields.

Temporary injunctions have been granted for 14 other fields where operators have brought court action in Austin. Hence, the commission's orders which were to have gone into effect December 1 in 16 fields have been largely nullified.

The injunctions have not deterred the state. Chairman E. O. Thompson of the commission revealed during testimony during the week that "show cause" orders will be issued soon for 20 other fields. The show-cause orders will call upon the operators to explain why they should not be compelled to quit flaring gas. Similar action preceded the shutdown orders of the fields now involved in court action.

As far as the Heyser field setback, the state has announced its intentions to carry the case to a higher court immediately, and prepared to appeal directly to the State Supreme Court, bypassing the Court of Civil Appeals. In the Seeligson case the second step was the State Supreme Court.

A total of 18 suits, in addition to the Heyser case, are on the docket in the Ninety-eighth and Fifty-third District Courts in Austin. The suits involve a total of 14 fields. Trial of Flour Bluff Oil Corp.'s suit on Flour Bluff field is scheduled for December 8. Humble Oil & Refining Co.'s case on Tijerna-Canales-Blucher field will come up December 10. The Fullerton field hearing is set for January 17 with Texas Pacific Coal & Oil Co. et al as plaintiffs.

Heyser Injunction Significant

Representatives of the attorney general's department have said during court proceedings that they consider Heyser field the worst culprit as far as the flaring of gas is concerned. Hence, the permanent injunction becomes even more significant.

In its argument, the state asserted that the producers have not been diligent in attempting to secure markets for residue gas. Further, the state called attention to the fact that gas wastage hearings were held as far back as 1946 so that operators have had sufficient warning. Asst. Atty. Gen. Elton Hyder, Jr., testified that more than 20,000 M.c.f. of gas is being flared daily in the Heyser field and called it "enough to take care of the needs of a city like Austin for 1½ days." He described the gas assertedly being flared in all the 16 fields as 3,000,000 M.c.f. of gas every 10 days or enough to supply Austin for 6 months.

Price Daniel, Attorney General of Texas, who entered the arguments during the closing phase of the case, declared that gas conservation has been neglected in Texas while emphasis has been directed to oil production. He argued: "If we had evidence before us today of thousands of barrels of oil being poured out on the ground and burned, would anyone say that the commission was unreasonable in ordering the burning of oil to stop immediately?"

For the plaintiffs, Nelson Jones, chief counsel for Humble Oil & Refining Co., testified that it is physically impossible to stop the flaring or venting of casing-head gas until compressor plants are installed and pipe lines built. Such projects are being rushed to completion as rapidly as building materials can be secured, he added.

Oil Loss Exceeds Gas Value

Jones told the court that "demand exists for every barrel of oil in Texas". He said the physical loss of oil caused by the shutdown order would far exceed the value of gas now being flared. The plaintiffs anticipate law suits on the part of property owners whose leases are set up on the basis of continued production. The operators also predicted that many wells could not be restored to production after a shutdown, and also that salt-water encroachment would harm the reservoir in the event of a shutdown.

The attorneys for the oil producers repeatedly mentioned that the commission order would deny them property rights "without due process of law" as guaranteed by the Fourteenth Amendment to the U. S. Constitution. Both sides discussed and argued the Seeligson case in great detail in an attempt to interpret it to their benefit.

The Seeligson case involved the field by that name in Jim Wells County. The Railroad Commission attempted to close it down, but operators enjoined it from enforcing the act and were upheld by the Texas Supreme Court. However, the court did hold that the commission has the power, where exercised reasonably, to close down an oil field in the interest of conservation.

Basing-Point Rule Is Ruinous, Oil Men Say

WASHINGTON.—A refiner and a distributor told the Capehart trade policies subcommittee this week that the outlawing of basing-point pricing in the oil industry would drive countless members of their groups out of business.

Testifying before the subcommittee December 7, Roland V. Rodman, president of Anderson-Prichard Oil Corp., Oklahoma City refiner, and Harry E. Milton, president of Milton Oil Co., St. Louis distributor, declared their companies, typical of a large segment of the industry, would be utterly unable to maintain their present scope of operations if products had to be sold on an F.O.B.-refinery basis as the result of across-the-board application of recent court decisions outlawing basing-point pricing.

"If the petroleum industry is required to adopt an F.O.B.-mill basis for its sales, every refiner will be given an island of monopoly in the vicinity of his plant extending in each direction halfway to the point of production of the nearest competition," Rodman explained. "This would mean that plants in sparsely settled areas would not have sufficient business upon which to operate and that plants in high-consuming areas would not have sufficient products to meet market demand."

Refineries located near their crude supplies may have a laid-in transportation cost on the crude refined as low as 5 or 6 cents per barrel, while those located at points of high consumption such as Chicago may have a cost of about 40 cents from West Texas fields, Rodman pointed out. "We are now led to believe that it is proper for a refiner located at a point of high consumption in the Midwest to absorb a high laid-in cost on the raw commodity, but that a refiner located beyond so-called Group 3 cannot absorb freight on the refined product reaching the same market on a competitive basis," he said.

If refiners beyond Group 3 are to share in the Midwest market under today's conditions, it is necessary that certain freight be absorbed by them in order to compete with refiners located in Group 3, he declared.

Elimination of basing-point pricing will bring about a "complete modification" of the economic conditions under which independent marketers "are compelled to operate in a market in which monopolistic tendencies are strengthened by government edict," Milton told the subcommittee.

Milton said his company, and many like it, will be forced to contract operations under an F.O.B.-refinery system because of inability to secure supplies on as favorable terms as competitors.

Some Unit Agreements Are Ruled Subject to Corporation Taxes

WASHINGTON.—The Internal Revenue Bureau held last week that certain types of joint operating agreements entered into by oil or gas producers will be subject to corporation taxes effective January 1, 1949, while other types will be considered as qualified partnerships, and gave participants in the former until December 31 to modify their agreements so as to escape the corporation levy.

The question of unit-agreement taxation has been pending before the bureau for many months, arising out of what is known as the West Alice field case, where a proposal several years ago to make unit operators' associations taxable was dropped when it was argued such action would interfere with the war effort by discouraging unitization.

An Income Tax Office Decision (I.T. 3930) signed by Commissioner George J. Schoeneman and approved by Acting Secretary of the Treasury John S. Graham, sets forth in detail the results of an examination of the provisions of typical operating agreements, as the basis for the decision regarding the different tax status of different types.

Features of the Agreement

1. The costs of development and expenses of operation are to be prorated among the parties in accordance with their respective interests.

2. Division of the oil proceeds is usually accomplished by payment of the purchase price by the pipe-line company or other purchaser directly to the several parties in accordance with their respective shares as indicated by division orders signed by them. Generally, any party may take his share of the oil in kind. Where that right exists, any authority given the operator to market the oil may be revoked upon proper notice. Sometimes, however, the operator is authorized without qualification to market the product.

3. The operator is required to carry adequate insurance and to make an accounting.

4. Operating agreements remain in force until the mineral is exhausted or, in the case of unit operating agreements, for the term of the lease or leases or renewals thereof. Sometimes an express provision is made for withdrawal of one of the parties by assignment of his rights to the others.

5. The parties have voting power proportionate to their interests to choose and advise the operator (in cases in which only one lease is involved, broad powers are commonly vested in the operator), to change the operator, to determine drilling and operating plans, to audit and pass on the operator's accounting, and to pass on transactions for disposal of surplus equipment.

6. Any party may sell or encumber his entire interest, but may not subdivide or sell without giving the others preferential option (in the case of agreements covering single leases, the contract may not contain express provisions to that effect).

7. The liabilities of the parties are to be separate and not joint.

"Such agreements, in the absence of provisions to the contrary," it was held, "create mining partnerships which differ from general partnerships principally in that (1) they can arise only between joint operators, (2) they extend to and are terminated by exhaustion of the mineral deposit, (3) the majority in interest controls policies, and (4) the death of a participant or the transfer of his interest does not interrupt the relation—the heir or transferee becoming a participant.

"The definitions of the terms 'partnership' and 'corporation' in section 3797 of the Internal Revenue Code and corresponding provisions of prior revenue laws in effect classify any organization carrying on business, financial operations, or ventures for the joint profit of the associates as either a partnership or a corporation, depending upon which of the two it more nearly resembles. It thus appears that those group organizations which attain the corporate attributes of centralized management and continuity of life are associations taxable as corporations, but those which do not have such attributes are comprehended by the term 'partnership.'"

Object Is Not for Joint Profit

"Manifestly, profits arise not from mere extraction or from the processing of mineral, but from the sale thereof," Schoeneman pointed out. "Accordingly, it seems clear that if the joint objective is limited to development and the extraction and processing of mineral (at joint cost and expense to be met by contributions of the respective participants) for division in kind or for sale for the account of the several participants individually, the test of a joint venture for joint profit is not met. An organization created by such an agreement does not qualify as a corporation as defined in section 3797 (a) (3) of the Internal Revenue Code. As such agreements commonly allow the participants to take their shares of the mineral in kind (or provide for the sale of the shares of the respective participants for their individual accounts under revocable agency powers), the sale of the mineral, even though made by the operator, is a sale by or on behalf of the individual participants. In such cases there is no joint profit contemplated or realized by the associates. That being true, such organizations may be classified for federal income tax purposes as joint ventures or partnerships only in a qualified sense. Under I. T. 2749 and I. T. 2785, such joint operators are required to file qualified partnership returns showing only items of gross income and deduction. If such a qualified partnership return were not required, it would be necessary for each of the joint owners to submit the same information by schedule attached to their individual returns.

Effect on Income

"For the reasons stated, in the case of operators' agreements in which the participants reserve the right to their shares of the oil in place (or the equivalent, i.e., the right personally to sell or direct the sale thereof for their benefit, or permit the operator to do so for them for the time being), it is held that the participants, through the partnership thus created, individually own depletable economic interests in the oil and gas in place and must report the proceeds therefrom as their income. On the contrary, where agreements irrevocably vest the operator in his representative capacity with the authority to extract and sell the mineral, there are created for income-tax purposes associations taxable as corporations, which associations are the owners of the depletable economic interests in the oil and gas in place and of the income derived from operations.

"In view of the foregoing, I. T. 2749 and I. T. 2785 are modified to accord with the conclusions reached herein. The bureau, under those rulings, has consistently treated all such operating agreements as creating qualified partnerships, rather than associations, with the result that the participants therein have been taxed as individuals. Under authority contained in section 3791 (b) of the Internal Revenue Code, this ruling will be applied only to taxable years beginning on or after January 1, 1949. Accordingly in the case of a joint operating agreement which creates an organization classifiable as an association under the principles contained herein, an amendment prior to January 1, 1949, to create an organization not so classified hereunder will avoid reclassification and treatment of such organization as an association under the Internal Revenue Code."

this week

GOVERNMENT— Congressional committee may look into crude-price situation in connection with study of oil and other industry profits. . . . ¶Oil witnesses testify on basing-point prices as committee counsel criticizes FTC for upsetting established distribution pattern. . . . ¶Retiring OGD head warns against too much preparedness planning. . . . ¶Agreements allocating steel to oil uses may be extended. . . .

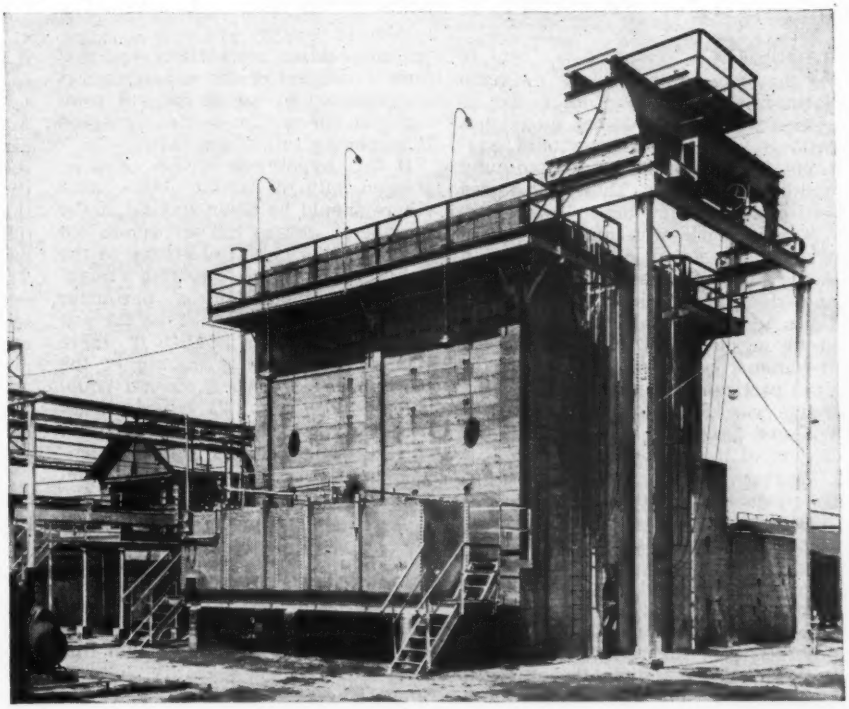
PRODUCTION—Crude-price stalemate continues. . . . ¶Texas operators enjoin Railroad Commission from closing down fields where waste of gas is alleged. . . . ¶Attorneys general resolve to fight for state control of offshore drilling though President Truman will seek legislation for administration of California tideland areas. . . . ¶Bureau of Internal Revenue rules that certain types of unit operating agreements are taxable as corporations.

TRENDS— U. S. crude production averaged above 5,600,000 bbl. daily for past 6 consecutive weeks. . . . ¶Well completions for the week ended December 4 totaled 790. . . . Shows gain of 23 over previous week and an increase of 96 over comparable period a year ago. . . . ¶Crude runs for 8-week period ended November 27 averaged 5,625,000 bbl. daily or 7.6 per cent above same period last year. . . . Gasoline production averaged 2,490,000 bbl. or 6.9 per cent above same period last year. . . . Kerosine production was 340,000 bbl., a gain of 11.4 per cent. . . . Distillate production was 1,074,000 bbl., up 16.7 per cent over last year. . . . Residuals increased to 1,313,000 bbl. daily or a gain of 7.5 per cent. . . . ¶Weakening trend in spot-market trading of petroleum products continues. . . . Major companies on Eastern Seaboard reduce wholesale prices of products. . . . Group 3 published prices reduce the low from range oil on down. . . .

INTERNATIONAL—U. S. State Department notifies Hungarian Government that last September's seizure of American oil property is illegal. . . . Hungary is held responsible for continued operations and for value of companies' assets. . . . Charges allegations against company officials are fradulent. . . . ¶Currency reform in Germany aids oil business in western zones. . . . Emsland field gets major play. . . . Hydrogenation plants converted to crude-oil processing. . . . ¶Venezuelan Government will lose premiums on royalty oil produced and purchased by Shell. . . . Other companies may follow suit on expiration of bonus agreements. . . . ¶Government and employe delegates support, employer representatives oppose, 40-hour week in petroleum industry. . . .

PIPE LINES—1948 construction on Tennessee Gas Transmission lines brings present capacity to 605,000,000 cu. ft., almost double capacity last December. . . . Should help alleviate shortage in Appalachian area this winter. . . . ¶Socony-Vacuum's Malvern, Pa.-Binghamton, N. Y., line nearly complete. . . . ¶Court invalidates FPC injunction to block payment of Panhandle Eastern dividend in Hugoton stock. . . . ¶Trainload of 45,000 ft. of 22-in. pipe starts work on six spreads of Ozark system from Cushing to St. Louis. . . .

REFINING— Sinclair closes Sand Springs refinery, fourth since products line went into operation. . . . Kansas governor protests closure of Kansas plants. . . . ¶Esso Standard first to make synthetic alcohol commercially. . . . Considers converting larger plant to alcohol production. . . . ¶Globe Oil & Refining adds catalytic unit to Lemont, Ill., plant. . . . ¶Perco refining unit, 1,250 bbl. per day capacity will be added to Shallow Water, Kans., plant. . . .



This odd-looking piece of refinery equipment is a reinforced concrete stall at the Baton Rouge refinery of Esso Standard Oil Co. which is now producing the first commercial quantities of isooctyl alcohol, a basic ingredient in plastics manufacturing. Raw materials are gasoline, hydrogen, and carbon monoxide, used in a new process described on page 125 of this issue

Shown at the A.A.P.G. regional meeting in Houston, December 2 and 3, are national officers of the association: Roy Barnes, Continental Oil Co., vice president; C. L. Moody, Ohio Oil Co., editor; Paul Weaver, Gulf Oil Corp., president; George S. Buchanan, Sohio Petroleum Co., chairman of general arrangements committee for the meeting; and C. E. Dobbin, U. S. Geological Survey, past president

Salt Domes Thoroughly Studied At A.A.P.G. Regional Meeting

by Leigh S. McCaslin, Jr.

HOUSTON.—"About 50 per cent of the known salt domes do not have substantial oil production. I see no reason why all the domes should not produce oil. Geologists should continue to study salt domes and why and how they grow. These salt domes will pay off in new oil."

This remark was made by Paul Weaver, president of the American Association of Petroleum Geologists and chief geophysicist for Gulf Oil Corp. at a regional meeting of the group in Houston December 2 and 3. It summarizes aptly the reason for this particular meeting where the theme was "Stratigraphy, Sedimentation and Tectonics of the Salt Dome Region of the Gulf Coast."

Weaver, himself, presented one of the 13 papers given before the 1,050 geologists attending. In his paper, "Modern Views as to Salt Dome Mechanics," Weaver emphasized that all ideas on the subject should be put to a quantitative test. To illustrate, he described work in exploring the hypothesis that "the salt dome, once it has pierced the sediments and these latter have become uplifted, has fixed its cross-section horizontally, and that later movement of the salt upward is accompanied by additional salt coming from the mother bed and keeping this opening full of salt."

If this hypothesis is true, Weaver pointed out, it would follow that "there should be down-sinking of the peripheral sink as the salt comes out of the mother bed proportional to the uplift of the salt." In pursuing a quantitative approach on a particular dome, Weaver found that "as the salt rose from 5,000 ft. to 2,000 ft., there was a corresponding sinking of the flank beds at 5,000 ft. in an equal volume of about 1.25 cubic miles." Weaver expressed the hope that "each of you will make this kind of calculations for the domes in which you have particular interest."

In his paper, Weaver mentioned that the association had under consideration a research project wherein scale models would be constructed to investigate ideas as to salt dome mechanics. Before the 2-day meeting was over, it was announced that this project had become a reality. John T. Rouse, Magnolia Petroleum Co., chairman of the A.A.P.G. research committee, told the assembly that work on such a project will be started immediately at Texas A. & M. College. The research will be a joint project of the school's geology department and engineering and experimental station under the direction of S. A. Lynch, T. J. Parker, and A. N. McDowell. L. L. Nettleton, Gravity Meter Exploration Co., and M. King Hubbert, Shell Research & Development Co., will aid the research in a consulting capacity.

In the paper, "Problems of Deep Drilling in the Gulf Coast Area," Olin G. Bell, Humble Oil & Refining Co., and coauthors predicted that we are fast approaching the economic limit in deep drilling. Bell remarked: "The costs are almost prohibitive. The probability of adding greatly to our oil and gas reserves is greatly reduced."

Bell, however, did express the belief that we have the "know how" and equipment to drill to 20,000 ft. Also, he continued, "There appears to be no reason why producible hydrocarbons cannot be found under favorable geologic conditions, down to 20,000 ft."

Deep Drilling Probable

In emphasizing the geological aspects of deep drilling, Bell gave a good description of what might be expected geologically at great depths. He stated: "From the standpoint of stratigraphy we may expect to find sedimentary beds down to the basement complex. It is doubtful if we will find the basement complex above 20,000 ft. in the coastal area, therefore we should have no hesitation about the presence of sedimentary rocks down to that depth.

"The presence of reservoirs at greater depths is, perhaps, a little more questionable, yet our experience seems to indicate there can be reservoir space below the depths we have reached so far and these reservoirs can occur in lime or in sand. In sand sections the permeability and porosity may be so reduced that a greater thickness of sand section will be required in order to have space comparable to that at shallower depths. This reduced reservoir space, however, should be at least partially offset by the higher reservoir pressures encountered with depth. . . . There are numerous operational problems, such as abnormal pressures, high temperatures, and many others, which will be more severe, but not insurmountable."

A paper which prompted much discussion concerned the relatively new procedure of using aerial photography in geologic study. Charles DeBlieux of New Orleans covered the subject in his talk, "Photogeology in Gulf Coast Exploration." In demonstrating the increasing use of this media, DeBlieux stated: "During the year 1947, more than 110,000 sq. miles in the Rocky Mountain region were covered

These men of the Houston Geological Society planned the 2-day regional meeting of the A.A.P.G. in Houston which was attended by over 1,000 "rock hounds": Arthur S. Gale, Jr., Hillard W. Carey, Carleton D. Speed, Jr., George S. Buchanan, R. R. Rieke, and A. F. Childers, Jr.

photogeologically. As interest in the method increases, it is being realized that this type of interpretation is not limited to those physiographic provinces of sparse vegetation and bold outcrop pattern, and photogeologic programs are currently in progress in many varied sections of the United States."

The entire program of 13 papers was characterized by those in attendance as "exceptionally good" and "outstanding." Other talks presented included: "Types of Gulf Coast Salt Domes," O. Wilhelm, Shell Oil Co.; "Recent Sediments of the Mississippi Deltaic Mass," H. N. Fisk, Humble Oil & Refining Co.; "Stratigraphy of the Frio Formation in Orange and Jefferson Counties, Texas," Frank Reedy, Crown Central Petroleum Corp.; "Sedimentary Facies of the Upper Cenozoic and Recent in the Gulf Coast Geosyncline," Sheperd Lowman, Shell Oil Co.; "Salt Dome Configuration," Marcus A. Hanna, Gulf Oil Corp.; "Tertiary History of the Gulf Coast Geosyncline," Martin M. Sheets, Production Maintenance Co.; "Possible Effects of Salt Intrusions on Sedimentation at Boling Dome," William M. Cogen, Shell Oil Co.; "Exploration in the Gulf of Mexico with the Air-Borne Magnetometer," Eugene Frowe, Robert H. Ray Co.; "Oil in the Gulf of Mexico," D. A. McGee and A. T. F. Seale, Kerr-McGee Oil Industries, Inc.; and "Recent Developments in Geophysical Exploration Equipment," C. H. Carlisle, Humble Oil & Refining Co.

Sponsored by Houston Geologists

Officers of the Houston Geological Society which sponsored the successful 2-day meeting are: A. F. Childers, Jr., president; Hershal C. Ferguson, vice president; R. R. Rieke, secretary; and Mary Loreen Holland, treasurer. Committee chairmen for the meeting were: George S. Buchanan, general arrangements; Paul Leaven w o r t h, program; Hillard Carey, technical; Carleton D. Speed, Jr., hotels and housing; E. O. Buck, finance; Don Gahagan, entertainment; J. Brian Eby, publicity, and Frank Gardner, registration.

Tidelands Resolution Adopted by Association of Attorneys General

HOUSTON.—At its concluding session here last week, the National Association of Attorneys General adopted a strong resolution reiterating its stand of state ownership of lands beneath navigable waters.

Attorney General J. E. Taylor of Missouri, President Truman's home state, cast the only vote against the resolution. However, Attorney General Robert E. Smylie of Idaho abstained from the voting.

Included in the five-point resolution was an expression of opposition to any agreements between private oil interests and the Departments of Justice and Interior under which the oil interests would be relieved of accounting for past oil runs and have present state leases converted to federal leases. The attorneys general also made it clear that they did not want any part of their fight financed by oil money.

The text of the resolution was as follows:

"1. That we continue to urge the adoption by the Congress of an act recognizing that ownership of lands beneath navigable waters within the several states is and shall continue to be vested in the respective states, subject only to the paramount rights of the federal Government in a national emergency, in commerce, and in national defense, the exercise of which shall never of itself vest any proprietary interest in such lands in the federal Government; but recognizing the right of the federal Government to take any of such property necessary for national defense by priority purchase or due process of law.

"2. That we vigorously oppose any agreements between private oil interests and the Departments of Justice and Interior under which these interests would be relieved of accounting for past oil runs and have present state leases converted to federal leases; and oppose any proposed legislation which will permit the Department of Interior or any other federal agency to lease, to private interests, lands beneath navigable waters.

"3. That the president of this association immediately appoint a committee of seven attorneys general to seek accomplishment of this association's legislative objective aforesaid, and to draft such legislation which it deems advisable to be presented to Congress for consideration on the subject matter herein mentioned; that said committee be authorized to receive and expend in the name of the association voluntary contributions from the public funds of the several states to cover the expenses of presenting this legislative program to the committees of Congress.

"4. That the association offer its cooperation to the Governors' Conference and urge the Council of State Governments to continue full use of its facilities for the accomplishment of the purposes of this resolution.

"5. That all such activities of this association shall remain entirely independent of private interests and shall be financed solely from public funds voluntarily contributed by the states as aforesaid."

The seven-man committee named by the association's new president, J. A. A. Burnquist of Minnesota, in accordance with the above resolution consists of: Hall Hammond, Maryland, chairman; Price Daniel, Texas, vice chairman; Fred C. Howser, California; Bolivar Kemp, Louisiana; Edward F. Arn, Kansas; George Neuner, Oregon; and A. E. Funk, Kentucky.

WORLD-WIDE OIL DEVELOPMENTS

State Department Files Formal Protest Over Hungarian Seizure

WASHINGTON. — The State Department last week formally notified the Hungarian Government that its seizure of American oil properties in September on the pretext that the Hungarian - American Oil Co. (MAORT), a Standard Oil Co. (N.J.) subsidiary, had committed "industrial sabotage" was considered illegal and Hungary would be held responsible for the continued operation of the properties and for the value of the assets of the companies as of September 25, the date of seizure.

In diplomatic language the department told Hungary its charges against the company were a tissue of lies and the "confessions" signed by Paul Ruedemann and George Bannantine, company officials, at the dictation of the Hungarian police were equally fictitious.

The two Americans were arrested and for several days were held in solitary confinement and subjected to extensive questioning. Realizing the hopelessness of their situation, they eventually signed alleged "confessions" which they then were required to copy in their own handwriting to give them an aura of authenticity. Upon release, the two officials came to Washington to report on the matter to State Department authorities. *(The Oil and Gas Journal, October 7, p. 128).*

Trial Opened Last Week

With the opening of a "trial" of four officials of the company in Hungary last week, the department filed its formal protest, charging the allegations were fraudulent and had been made to feign grounds for bringing the companies under Communist control, as well as for propaganda purposes, and warned that the seizure was "an encroachment on American rights and interests in Hungary for which the Hungarian Government must bear full legal and financial responsibility."

The note, delivered by the American Legation in Budapest to the Hungarian Ministry for Foreign Affairs November 30, made it clear that the United States reserves all rights on its own behalf and on behalf of its nationals with respect to the status and property of MAORT and its subsidiary, the Maort Gas Trading Co.

Charges Refuted

Standard Oil, the Hungarian Government was informed, has "fully and conclusively refuted" the charges of industrial sabotage which, the note said, "are compounded of various assertions to the effect that the owners and officials increased oil production during the recent war, thus assuring significant support for the German war machine; that they decreased production after the war to hinder Hungary's economic development for political reasons and did this with the knowledge and under the direction of American Mission officials in Hungary; that they carried out this 'sabotage' on the financial side by improper expenditures and management, against the Hungarian planned economy by disregarding instructions of the National Planning Office and by preventing the purchase of necessary equipment and the repair of machinery, on the technical side by drilling exploratory wells at unpromising sites, hindering research, and improperly completing the wells, and, as regards the construction of the Lispe-Budapest natural gas pipe line, by placing every possible obstacle in the way of the project."

"The legation is instructed to inform the ministry for foreign affairs that the Government of the United States emphatically rejects as false and malicious in their entirety the charges of 'sabotage' which the Hungarian authorities have made against the owners and officials of MAORT," it continued. "Moreover, the United States Government regards these allegations as having been politically motivated to serve the purposes of Communist propaganda and to feign grounds for bringing the companies under Communist state control. In attempting to develop its fraudulent case against MAORT, the Hungarian Government has played up as primary evidence the alleged 'confessions' of Paul Ruedemann and George Bannantine, American officials of the company. However, the facts in this connection, attested by sworn statements made by the two men upon their release from Hungarian police custody, are now well known. The truth concerning these 'confessions,' which were so hastily publicized in the obviously prefabricated Hungarian 'Grey Book' and elsewhere, is (1) that they were prepared by the Hungarian police, (2) that their contents are wholly false, and (3) that force and duress were employed against Mr. Ruedemann and Mr. Bannantine to compel them to copy in longhand and sign the documents. From these circumstances alone, the conclusion is also warranted that the 'confessions' obtained by the Hungarian authorities from Dr. Simon Papp and other Hungarian employes of MAORT are likewise of a spurious character and were exacted by the usual police-state methods.

"The Government of the United States also deems it appropriate, relative to the principal accusion made by the Hungarian authorities against MAORT concerning the decreased rate of crude-oil production, that the legation should not only affirm the fact that MAORT consistently adhered to a policy of rational exploitation in the interest of conserving the oil resources of Hungary but should also draw attention to the fact that both the secretariat of the Hungarian supreme council and the experts of the Hungarian Ministry for Industry in the middle of 1947 recognized the necessity for reducing the rate of MAORT oil production."

The department cited a memorandum of the Ministry for Finance dated July 8, 1947, calling for a cutback of 16 per cent in production as the only way of preventing the loss of 3,500,000 tons, or 50 per cent, of the Hungarian oil reserves.

"It is evident in the light of the essential facts set forth above—facts which are supplemented by many pertinent details in the Standard Oil

Co.'s extended account of MAORT's operations—that the charges of 'sabotage' brought by the Hungarian Government against the owners and officials of MAORT cannot be sustained, are therefore inadmissible, and cannot, as pretended by the Hungarian Government, serve as justification for that government's action in taking over the management of the MAORT properties," the note concluded.

"In these circumstances, the Government of the United States looks upon the Hungarian Government's course and manner of proceeding in this matter as an encroachment upon American rights and interests in Hungary, for which the Hungarian Government must bear full legal and financial responsibility."

Department officials admitted privately that there is little expectation that Hungary will take any remedial action as a result of the protest, but it was pointed out it paves the way for the filing of claims and more definite action if and when Hungary is dragged out from behind the iron curtain.

Shell Is First to Discontinue Premium Payments for Venezuelan Royalty Oil

SHELL companies operating in Venezuela have notified the government they will no longer pay premium prices for the government's royalty oil from their producing concessions.

Shell is the second largest producing organization in Venezuela, and according to reports in New York, its arrangement to buy the royalty oil at a bonus expired before that of any other of the principal companies.

Until last year, the Venezuelan Government always sold its one-sixth royalty to the producing company at standard prices. As supply tightened, foreign crude buyers offered premiums, and the government exercised its option to take the oil in kind. The operating companies met some of the higher bids to protect their supplies.

Indications that these arrangements will be terminated, not only by Shell but by other operating companies, testifies to the world-wide improvement in crude supply. Increasing production elsewhere, especially in the United States and the Middle East, has eased the heavy demand for crude oil.

Gulf Oil Corp., third largest producer in Venezuela through Mene Grande Oil Co., C.A., has a royalty purchasing contract expiring next month. Creole Petroleum Corp., major Venezuelan producer, and Socony-Vacuum Oil Co. of Venezuela are buying the royalty oil under arrangements terminating late next year.

Early this month, the Venezuelan Government offered 50,000 bbl. a month of Las Mercedes crude after the company, S.A. Petrolera las Mercedes (The Texas Co. and Caracas Petroleum Co.) declined to pay more than a price comparable to the same grade of Texas crude. Sacor, S.A., a Portuguese company, is reported to have bid $2.88 a barrel.

In Washington, the Venezuelan Government announced last week that bids for the government's share of production from Mara field in the state of Zulia would be received in Caracas until December 20. Shell is the operator in the field. About 115,000 bbl. monthly is involved for a year's period beginning in January. Only bids to be considered are those offering at least $2.77 per 30°-gravity barrel.

I. L. O. Oil Group Votes 40-Hour Week

THE petroleum committee of the International Labor Organization went on record in favor of a 40-hour work week in the oil industry throughout the world before it ended its recent meeting in Paris.

Government delegates from the United States were among those who voted for the resolution. Other government delegates voting approval were from Canada, Egypt, France, Iran, and Mexico. Colombia and the Netherlands government delegates voted against the resolution, and Britain, Iraq, and one of the Dutch government delegates abstained.

The 10-day meeting of the committee was convened in Geneva. Attending were 110 employer and worker representatives and government delegates from major oil-producing countries. Russia was not represented.

The resolution declared that "a normal working week of 40 hours for the petroleum industry is a desirable goal for which all countries should strive as soon as economic conditions permit." It was adopted by a vote of 29 to 20 with 8 abstentions. It was generally opposed by employer delegates and supported by employe delegates.

Almost the entire range of labor problems affecting the industry throughout the world was discussed during the meeting. Subjects included recruitment and training, safety and health, trade-union recognition and bargaining, developments in collective bargaining, and actual methods of handling disputes.

International

WORLD-WIDE OIL DEVELOPMENTS

Negev Drilling Operations Not Apt to Resume Soon

Drilling operations in the Negev desert area of southern Palestine have been shut down since last April, and there is little chance they will be resumed until the political situation clears.

Reports last week from Beersheba, Palestine, that oil had been discovered in the Negev were said to be incorrect by officials in New York. The single drilling operation by Petroleum Development (Palestine), Ltd., was at 3,464 ft. when abandoned. As far as is known, the rig remains on the site which is near Huleiqat, northeast of Gaza.

Petroleum Development (Palestine) is an associated company of Iraq Petroleum Co., Ltd., and holds a concession in the area from the former British Government mandate power. Which side will obtain sovereignty over the Negev is a principal point in the Jewish-Arab differences now before the United Nations.

Petroleum Development (Palestine) spotted several wildcat drilling sites in southern Palestine, and began work at Huleiqat before the British withdrawal from Palestine. There are some surface asphaltic deposits at the southwestern top of the Dead Sea, but whether the Beersheba reports referred to these is not known.

Australia Plans Increase Of Shale Oil Production

The Australian Government is planning to step up the production of oil from shale deposits in New South Wales to a total of about 650 bbl. daily.

Though small, the production of oil from shales in Australia is significant since the country imports all its requirements of natural petroleum.

The Australian minister for shipping and fuel said recently that plans call for increasing shale-oil output to about 10,000,000 gal. annually. This would be an increase of about 150 per cent over present production.

The shale deposits are refined at the plant of National Oil Refineries, Ltd., at Glen Davis in New South Wales. This plant at present has a capacity of 300 bbl. daily.

Petroleum Industry In Bizonal Germany Shows Upward Trend

A well in Steimbke field being drilled by Gewerkschaft Brigitta

International
WORLD-WIDE OIL DEVELOPMENTS

GERMAN oil-producing and refining industries, concentrated, with the exception of one plant, in the western occupation zones, were fortunate in not being divided by the iron curtain which affected so many other German industries. The oil industry profited by the effective stimulation of currency reform and, on June 21, 1948, the day on which the D-mark was introduced, the upward trend that had already started in the second half of 1947, received a needed boost.

At the time of the currency reform it seemed that the oil industry in the western zones had slowly overcome the effect of the long, hard winter of 1946-47, the low point in German postwar life. The oil plan, now aided by the European Recovery Plan, was created in September, and in the same month the first crude-oil imports after the war arrived at Hamburg.

Oil companies endeavored to increase exploration and drilling work and to develop the promising Emsland field, discovered in the last stage of the war. All efforts were slowed and hampered by lack of material and labor, a result of the lost war, and because the mark was nearly worthless. With the introduction of the new D-mark, laborers regained interest because their wages now could buy food and clothes. Work efficiency increased remarkably. Development in Emsland field made progress. Production and drilling footage rose and rebuilding of refineries was intensified.

Production Figures Encouraging

Germany's production depends primarily on three main provinces and a fourth of minor importance in the Rhine Valley.

Schleswig-Holstein - Hamburg with two fields, Heide in Holstein and Reitbrook near Hamburg, attained an all-time output peak in northwest Germany of more than 7,000,000 bbl. in the war year, 1940. Result of overproduction, ordered by the government, was rapid exhaustion of some acreage. Now oil-formation conditions are carefully watched and the production rate can be maintained on a level of about 1,750 bbl. daily for both fields.

Some of the fields of the Hanoverian area have produced since the end of the last century. The output of the biggest field, Nienhagen, near Celle, has slowly declined. Intensified drilling in the last year has resulted in some extensions and the discovery of a small new pool, Stemmerberg, several miles southwest of Hanover, which is not bound to a salt dome as are all other Hanoverian pools, but to an overthrust structure. Stemmerberg, which was discovered and is owned by Gewerkschaft Elwerath, started production in August of this year with a daily yield of 17.5 bbl. daily.

In the promising new Wesendorf field extention wells indicate that commercial production may be found not only on the southeastern flank of the salt structure, but on other flank sections and formations. In Hademstorf the Deutsche Vacuum Oel A.G., German affiliate of Socony-Vacuum Oil Co., Inc., has found a new Scholle (block) and deeper Wealden sands (Cretaceous). As a result, daily production rose from 105 bbl. to 257 bbl.

According to reserve estimates of the Reichsamt fuer Bodenforschung, Celle, the Hanover and Schleswig-Holstein-Hamburg oil provinces have a combined proven oil reserve of 18,900,000 bbl. The new Emsland oil province near the Dutch border is estimated to have almost four times this amount, or 63 to 84 million barrels. Thus Emsland field will be the future hope for German oil production, and it was not surprising when the Dutch claim for boundary rectifications, which includes the Emsland oil area, brought strong protests from German oil companies.

Emlichheim Is Part of Schoonebeek

A minor portion of the biggest West European oil field, Schoonebeek, which lies mostly in Holland but is divided by the international border, belongs to Germany. Emlichheim, the German portion of Schoonebeek, yields about 1,285 bbl. daily of a 25.1°-gravity oil with high soft-asphalt content. Several miles southeast the Georgsdorf field, a joint interest concession of four companies, produces about 1,170 bbl. daily. It is estimated that at least 400 well locations are still possible in Georgsdorf, the edge-water line not yet having been reached.

On the same concession, to the north, the Adorf 1, situated on a moor 12-15 ft. thick, was completed near the end of 1946 and now has a yield of about 85-95 bbl. daily. Seismic reflection work is under way to define the structure, which may be narrow. The easternmost fields, Lingen-Dalum, are the oldest ones, discovered in 1942 by seismic reflection. Dalum produces about 1,050 bbl. daily and, as in other fields, production will increase.

The three main producing fields now have transportation facilities by pipe lines to nearby railway loading platform. Adorf oil is being shipped by barges to the Ems River. Activity of the oil companies, street repairs, housing, geological and geophysical research work (with assistance of two newly imported American reflection seismograph units) has stimulated work in the Emsland area which up to now had been a remote agricultural border province. Emsland production accounts for 27.7 per

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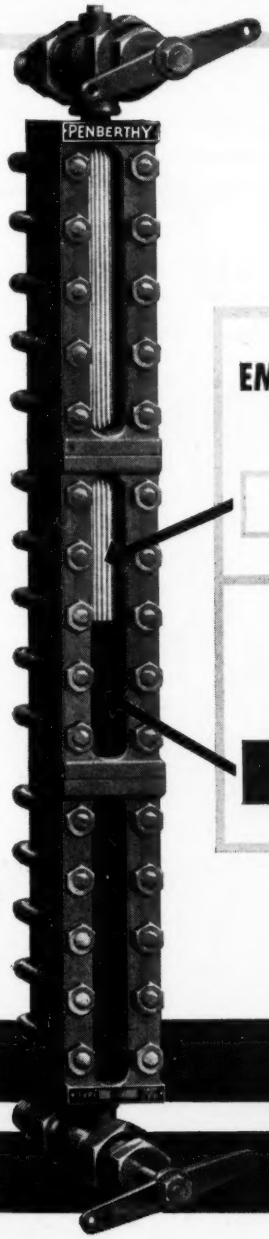

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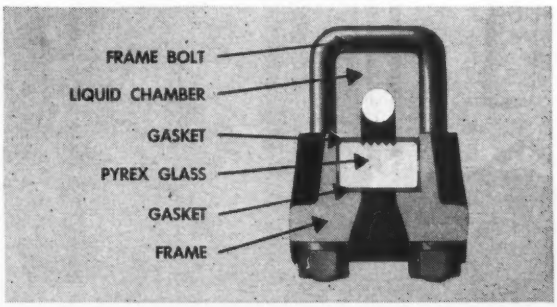

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Storage tanks and deemulsification operations of Gewerkschaft Brigitta in Steimbke field in northwest Germany. Gewerkschaft Brigitta is owned 50 per cent by Shell and 50 per cent by Jersey Standard

cent of the total German oil output. This share will probably be increased to 50 per cent in 2 years and to 75 per cent in the next 3 or 4 years. Geological conditions in Emsland are less complicated than on the heavily folded salt structures of Hanover and it seems to be certain that German oil companies will not continue wildcatting only to lose the profit they gain from Emsland production.

In the American occupation zone, the Swabian Bavarian Molasse trough is the object of extensive exploration plans. All companies concerned with oil production in Germany, including Standard Oil Co. (N.J.), Deutsche Shell A.G., and Deutsche Vacuum have applied for concessions which will be granted in due course. A wildcat well, Toelz 1, is already drilling and more locations are being considered.

This year German oil production will reach about 4,410,000 bbl., nearly 385,000 bbl. more than in 1947. This production will probably increase, provided the Emsland field is not lost. Production level can only be maintained by intensified drilling work. Deep drilling, steadily increasing since the capitulation, is largely responsible for the 450,000 to 470,000 total footage this year as against 348,777 ft. in 1947. Of the 1946 footage, 40 per cent was accounted for by wildcat wells. In 1948 wildcatting footage will probably be down 3 or 4 per cent.

Refining Capacity Is Increasing

In September of this year a decision was made by Allied authorities which has a far-reaching influence on the ability of Germany to process crude oil from domestic and foreign sources. Western Germany lost some big hydrogenation plants. Most of them were heavily damaged by air raids during the war but could have been restored. Though the coal shortage and the Potsdam agreement forbid the use of these plants for liquefying coal, a proposal to use them for crude-oil treating could not be ignored, since sufficient other capacity for complete refining is not available and since the Bizone must try to save dollars by importing crude instead of finished products. For these reasons permits for two Rhinish hydrogenation plants in Gelsenberg and Wesseling have been issued. Both plants can top crude and hydrogenate the residue, gaining 77 to 79 per cent more gasoline and gas oil. It is hoped that both plants will be ready in March or April 1949 to process the allowed limit of 3,500 bbl. daily, each. That means a total throughput of at least 5,040,000 bbl. of crude (probably Arabian), yearly.

Various refinery rebuilding work is in progress. Ebano Asphalt - Werke A.G., Hamburg-Harburg, an affiliate of Standard Oil Co. (N.J.) reached a 10,000-bbl. daily capacity in October of this year and therefore is in top place among German refiners. Ebano specializes in producing asphalt from Venevuelan crudes. At the nearby Hamburg - Harburg port area, 1,400 laborers are busy rebuilding the heavily damaged Deutsche Shell A.G. refinery. This work will be done in two stages: first the dewaxing and extraction units which are especially needed for Arabian import oil, and secondly the installations for topping and vacuum distillation. Shell hopes to complete repair work by summer of 1949. Also in the Hamburg harbor district the Eurotank cracking facilities will be restored with a daily capacity of 5,800 bbl. Deutsche Vacuum will add a 9,500-bbl. top-distillation unit to its lubricant refinery in Bremen-Oslebshausen and Wintershall has just finished enlarging its Salzbergen plant.

Present total capacity for German refineries is approximately 8,750,000 bbl. yearly and will increase next year, probably to about 18,900,000 bbl. yearly. The European Recovery Program foresees a supply of about 15,400,000 bbl. of petroleum products for the western zones in 1948-49 of which a steadily increasing portion can be imported as crude and then processed by German refineries.

Efforts of western Germany to regain normal living conditions are remarkably encouraged by the currency reform and will be further promoted by the Marshall plan which is just now making itself felt in the occupation zones of the three western powers. If peace can be maintained the recovery will certainly make further progress.

Soviet Reports Leningrad Gets Gas from Oil Shale

The Soviet news agency Tass has announced that Soviet Union technicians are the first to extract gas from oil shale on a commercial scale despite predictions of capitalist technicians that the project would fail, and that gas is now being delivered to Leningrad through a pipe line from Estonian shale fields.

Tass makes the claim that every part of the pipe line and compressor stations as well as in the factory which extracted the gas from shale was made in the Soviet Union.

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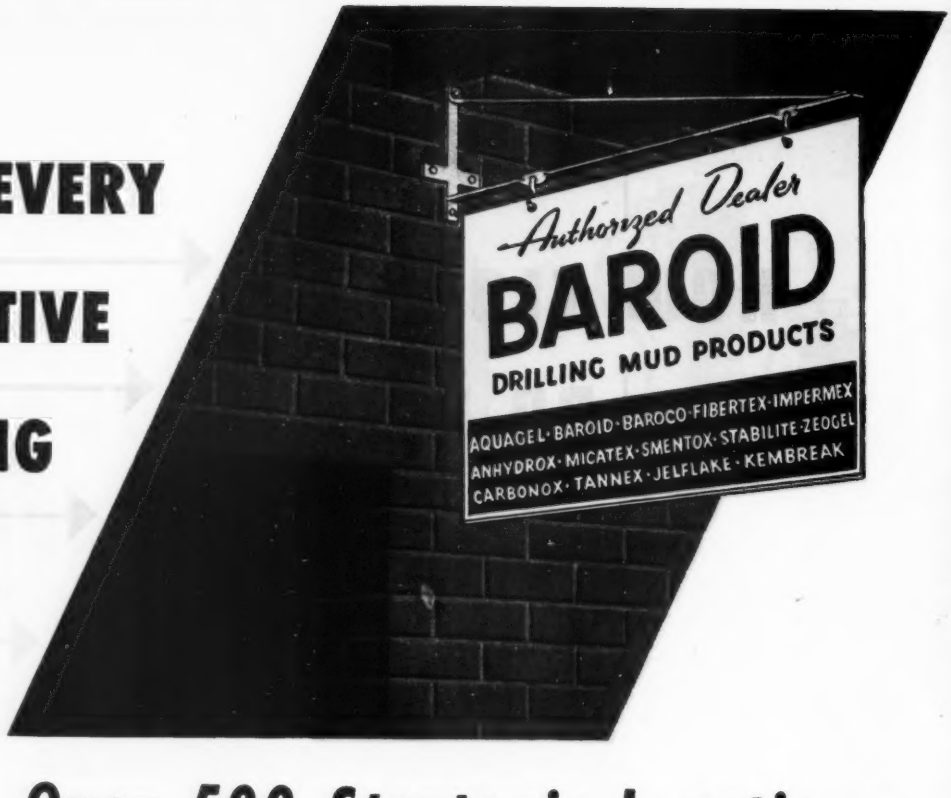
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Congressional Expert Criticizes FTC Ban on Basing-Point Pricing

AN economic revolution, involving revision of marketing methods and perhaps relocation of refineries, faces the oil industry if the Federal Trade Commission persists with its campaign to eliminate basing-point pricing and require virtually all commodities to be priced f.o.b. point of production.

Because of the importance of this problem the Journal here presents an address delivered before a recent meeting of the National Conference of Business Paper Editors in Washington by William Simon, chief counsel of the Senate committee on trade policies which currently is hearing complaints of businessmen against the FTC theories.

AFTER 25 years of litigating various phases of delivered pricing practices, the Federal Trade Commission achieved success in 1948 when the Supreme Court and Circuit Courts of Appeals affirmed its orders in the Cement Institute, rigid steel conduit, and Pittsburgh-plus cases.

The decisions in these cases and the arguments advanced by the commission during those proceedings have enveloped in uncertainty all pricing practices, in industries where freight is a substantial part of the delivered cost, other than f.o.b.-mill selling. Substantial numbers of businessmen now urge Congress to amend the law to permit uniform delivered prices, uniform zone prices, and freight equalization or freight absorption to meet competitors' lower prices, when such systems are practiced individually and not pursuant to a conspiracy or agreement.

It is my purpose to point out the issues which must be decided by Congress, with respect to the validity of pricing practices. It is of the greatest importance that the Congress and the people clearly understand the issue, for otherwise the proper answer to the problem may not be reached.

Is the commission's pricing policy limited to conspiracy cases? If so, there is no occasion for concern by any one. Not only is the commission opposed to all conspired prices, but the Congress is and I am certain will continue to be unalterably opposed to all price-fixing conspiracies, as are, and will be, the overwhelming majority of the American people. In fact, opposition to conspired price fixing is almost as universal as opposition to sin.

Is the commission's pricing policy limited to the question of who pays the freight bill? If so, the issue is not of vital importance to our American economy. Someone must always pay the cost of transportation, and it does not seem to be of controlling importance to our economy whether it is paid by the buyer or by the seller.

The real issue which we must face is: What will be the effect on our entire national economy of the Trade Commission's pricing policies? Will it be a beneficial or a harmful result? Will that pricing policy impair or will it promote our free-enterprise American competitive industrial system?

It must certainly be agreed that we cannot afford to impair the economic structure of our country and endanger our competitive industrial system, except as a calculated risk to achieve economic gains which outweigh the foreseeable disadvantages. We must determine whether we can afford to impair the right of American businessmen to openly and freely compete with each other, when it appears that this can only be done through freight absorption or freight equalization.

Long an FTC Aim

For more than 25 years the Federal Trade Commission has opposed delivered pricing practices. In 1924 it entered an order against the subsidiaries of the United States Steel Corp., affirmed last month, that requires them to sell at f.o.b.-mill prices.

The Trade Commission Act authorizes the commission to outlaw unfair methods of competition. The statute does not define that phrase and neither the Supreme Court nor the commission has ever done so. In a statement of policy issued by the commission on October 12, 1948, it advises that knowing parallel conduct is an unfair method of competition and illegal. The commission concludes that identical prices are collusive and illegal regardless of whether they result from conspiracy or from competition. The commission views similar prices resulting from competition as creating an economic result undistinguishable from similar prices resulting from conspiracy. But most businessmen deny that those practices are each equally iniquitous.

You will probably find that in any city many brands of chewing gum, cigarettes, gasoline, newspapers, and many other similar products are sold at the same price. That similar pricing pattern may well result from the fact that the sellers assembled in a smoke-filled hotel room and agreed to fix prices. But it may also result from the fact that the forces of competition do not permit one seller to charge more for his product than is charged by other sellers for similar products. The committee, however, views all "knowing parallelism" in pricing practices as unfair methods of competition and illegal, without respect to whether the parallelism results from conspiracy or competition.

Under this statute the commission says it may be legal for one seller to use a basing-point system, or freight-absorption practice, but that such practice becomes illegal if it is subsequently followed by his competitors.

Clayton Act a Factor

The third statute by which the legality of any pricing practice must be measured is the Robinson-Patman amendment to the Clayton Act. The key to an understanding of this act is the commission's philosophy that price, as used in the Robinson-Patman Act, means the seller's mill net return. It is the commission's view that a seller who sells the same product at the same delivered price to two customers who are located at unequal distances from his plant, receives discriminatory varying mill net returns. A seller who sells at the same delivered price to customers in a thousand different towns to which there are a thousand different freight rates has a thousand different mill net returns. These varying mill net returns also result whenever a seller absorbs freight on a sale to a distant customer in order to compete with a competitor whose plant is located closer to the customer. Such varying mill net returns are all discriminatory and they are illegal whenever they may injure competition.

In the Morton Salt Co. case, the Supreme Court held that an order of the commission would be sustained if the commission found a reasonable possibility of injury to competition.

The commission's complaint against the cement industry charged a conspiracy to fix prices through the use of the basing-point system. Its order found such a conspiracy. But when the case reached the Supreme Court, the commission injected the mill net theory into the case. It then argued that the cement companies' pricing policies resulted in illegal price discriminations irrespective of conspiracy or agreement. And its spokesman expressly conceded that a nondiscriminatory pricing practice in that industry required uniform f.o.b.-mill prices.

The commission has long contended that a buyer close to the seller's plant has an inherent economic right to purchase at lower prices than more

(Continued on page 155)

Power Utilization and Efficiency Is Theme of A.S.M.E. Annual Meet

by George Weber

NEW YORK.—Increased efficiency in the generation and utilization of power provided the dominant theme of the 5-day annual meeting of the American Society of Mechanical Engineers last week. Serving a horizontal segment of engineering which touches on all major industries, the meeting was marked by great diversification of subject material discussed in technical sessions and committee meetings.

In addition to the technical problems demanding attention, a growing realization of professional responsibility was reflected in discussions on education, guidance, and employment of young engineers. The wider scope of civic responsibility was given a prominent position on the program. Two new developments in mechanical engineering highlight this important attitude: the international standardization of screw threads, of far-reaching importance in both peacetime and war production, and the conservation of natural fuel resources through improved utilization.

Natural Gas Growth Recognized

The growing position of natural-gas fuel in the industrial East was recognized in two papers of particular interest to the petroleum industry. In discussing the effect of the introduction of natural gas on a highly industrialized territory previously supplied by manufactured gas, Paul R. Taylor of Stone & Webster Service Corp. stated that within 2 or 3 years natural gas will be available in practically all the large centers of industry in the United States. In comparison with present-day costs of solid and liquid fuels, natural gas can be purchased for industrial purposes at considerably less per therm, he continued, further enhancing its desirability over less-ideal fuels. In comparing industry's advantages over domestic consumers in the competition for natural gas, he left no doubt as to the vast market for the fuel, either as straight natural gas, or for enrichment of existing manufactured gas systems.

A timely subject, "Considerations Affecting Sound Utilization of Gas," was presented by Carl Wierum, Brooklyn Union Gas Co., who warned mechanical engineers that they share equal responsibility with the natural-gas industry in improving the conservation of that highly desirable fuel. Over 65 per cent of the 29 billions of therms (1 therm = 100,000 B.t.u.) sold by gas utilities in 1947, went to industrial and commercial users. He stressed the importance of obtaining complete combustion from all types of gases, a possibility where proper engineering is employed in design or selection of burners, furnaces, ovens, boilers, and other equipment. He stressed the proper employment of instrument control as a major factor in obtaining full utilization from gas or other fuels.

Technical Subjects Varied

From the practical engineering standpoint, a number of subjects touched on the production and particularly the refining of petroleum. Fluid metering, boilers and boiler feedwater treatment, heat transfer, instrumentation, oil and gas power, fuels, furnace performance, materials handling, lubrication, pressure vessels, metals, hydraulics, and safety were included among subjects holding interest to petroleum engineers.

Heat transfer came up for the greatest coverage, with particular emphasis paid to the design, operation, and maintenance of heat exchangers in petroleum refineries. The three phases of heat-exchanger operation—rate of fouling, reduction of fouling, and cleaning methods—were discussed by R. C. Butler and W. N. McCurdy, process engineers with Standard Oil Development Co. As a basis for their study, operating data from exchangers in various refinery services were examined and time rates of fouling determined. Preventive measures were then considered. Results from the use of additives, pressure and temperature control, blanketed feed tankage, and feed stripping were reported. Various cleaning methods — mechanical, sand-blasting, and chemical—were evaluated as to effectiveness for different types of equipment and fluids handled.

A similar study of fouling rates and cleaning methods of unfired heat exchangers, based on performance data and procedures from 1943 to 1947 at The Texas Co.'s Port Arthur refinery, was presented by J. H. Weiland, Jr., R. C. McCay, and J. E. Barnes of that company. This comprehensive survey showed graphically the rates of over-all heat transfer and exchanger fouling, and the changes in these rates after bundle cleaning.

The subject of cleaning exchangers was further enlarged in two papers dealing with mechanical cleaning and chemical cleaning. The former subject, presented by P. F. Dougherty and C. H. Brooks, process engineers with Sun Oil Co., Philadelphia, covered the use of emulsifying oil for in-place cleaning and the use of sand-blasting. Chemical cleaning, listing types of deposits, solvents and safe operating practices, was covered by C. M. Loucks and C. H. Groom of Dowell Incorporated.

Among those honored at the annual meeting was Carl F. Braun, president of C. F. Braun & Co., Alhambra, Calif., who was conferred an honorary membership in the society in recognition of his contributions to the technique of heat exchange and to the improvement of management-labor relations.

The National Exposition of Power and Mechanical Engineering, commonly termed the "Power Show," ran concurrently with the A.S.M.E. meeting, at Grand Central Palace, where 375 manufacturers exhibited equipment for the production, distribution, and application of power.

Canadian Companies Post Different Crude Prices

THE crude-price situation in Canada is nearly as uncertain as that existing in Mid-Continent fields in the United States, with two major purchasers posting widely differing prices, grade for grade and field for field.

On December 1, Imperial Oil, Ltd., cut the prices of crude 43 cents per barrel in Turner Valley and 52 cents in Leduc field. Prior to December 1, Imperial had paid $3.52 for 33°-gravity Turner Valley crude and now pays $3.09 for the same grade with a provision of 2 cents per additional degree of gravity up to 64°. It posted a price of $3.71 for Turner Valley crude of 64° gravity and over. At the same time it posted a price of $2.93 for Leduc crude for which it had been paying $3.45.

On December 4, British American Oil Co., Ltd., posted prices for the same fields that reduced the prices formerly posted but ran from 12 to 15 cents higher per barrel than those posted by Imperial. British American's postings, which were made effective December 4, quoted $3.24 for Turner Valley crude of 33° gravity. It made the same provision of 2 cents per additional degree of gravity up to 64°, posting $3.86 for Turner Valley crude of 64° gravity or higher, in both cases 15 cents a barrel higher than Imperial's postings.

British American posted a price of $3.05 for Leduc - Woodbend - Calmar oil, 12 cents higher than Imperial's posting. It also posted a price of $2.78 for Redwater crude. There are only two producing wells in Redwater field, both belonging to Imperial.

New officers elected by P.E.P.A.: L. V. Dugas, Gulf States Utility Co., Beaumont, secretary-treasurer; J. B. Moore, Northern Indiana Public Service Co., Hammond, vice president; C. L. McNeese, Houston Light & Power Co., Houston, president. W. H. Stueve, executive assistant, Oklahoma Gas & Electric Co., was awarded a P.E.P.A. plaque for his 25-year service in extending electric power usage

Low-Cost Power, More Electrical Equipment Are P.E.P.A. Themes

by Kenneth B. Barnes

OKLAHOMA CITY.—The low final cost that is provided the petroleum industries by purchased electric power and the usage of more electric equipment were the twin themes at the twentieth anniversary meeting of the Petroleum Electric Power Association held here December 1-3. Some 150 engineers from power companies and electrical equipment manufacturers indicated from their discussions of the 10-paper program that the future looked very good indeed for both more power sales and more electric installations in oil divisions.

Electrical usage in the oil fields, for example, has grown from 12½ per cent electrification of pumping wells in 1938 to 20 per cent in 1944 and to 23.4 per cent in 1946. It was reported that at the present rate 31 per cent of pumping wells would be electrified 4 years hence. Growth records in electric power acceptance, however, obviously are not necessarily an automatically functioning process. This was pointed out in P.E.P.A. papers dealing with the essentials of selling power for oil-field, pipe-line, and refinery usage. The desirability of providing engineering assistance to power purchasers, cooperation in handling electrical operational problems with oil companies were stressed.

On the equipment side of the program, J. N. Poore, General Electric Co., Dallas, provided a useful overall guide for selecting pumping motors:

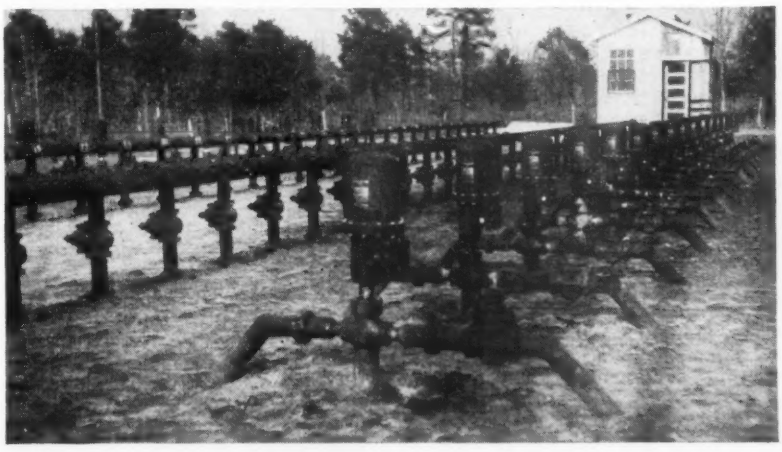
The normal-slip, normal-starting-torque motor is only applied (1) when the motor size is above 10 hp., and (a) power is supplied from a large generating plant or from the electric utility power system; (b) the wells are properly counterbalanced and pariffin is not excessive; (2) when tests of the wells indicate conclusively that 150 per cent starting torque will be sufficient.

The normal-slip, high-starting-torque motor is usually applied when (1) the required motor is 10 hp. or less, unless it is definitely known that a normal-torque motor is satisfactory; (2) existing well conditions are not thoroughly known; (3) there is conclusive evidence that very-high-starting torque (up to 250 per cent of full-load torque) is required. Since it is so difficult to predict well conditions, this type of motor is the most generally used.

The high-slip, high-starting-torque motor is recommended when (1) power is supplied from a small, isolated generating plant; (2) additional cushioning effect, over that obtained with a normal-slip motor, is desirable; (3) it is advisable to minimize current peaks; (4) an unusually high pumping speed (30 strokes per minute or higher) is required, which would result in very high peaks. Poore defined a high-slip motor as one with a slip of 8 to 13 per cent.

Electrical-design features of the new "Ozark" crude-oil pipe line were described by M. A. Hyde, Westinghouse Electric Corp., East Pittsburgh, Pa. Now under construction by Shell Pipe Line Corp. in partnership with Texas Pipe Line Co., this 22-in. line will operate as a joint project from Cushing, Okla., to Wood River, Ill.

Hyde also told about the comparatively low cost (considering the long-time continuous savings in operating costs) of these modern semi-automatic stations. The over-all cost of the Ozark system along with the 10-in. Shell line, including the value of the existing 10-in. pipe line as utilized in the project, will be approximately $36,000,000. Of this, electrical equipment, including the power transformers at the station sites, switchgear, motor control, motors, ventilation apparatus, valve operators, protective temperature and pressure relays, and electrical facilities for flow control at the tankage at each end of the line, plus installation, will total about $1,470,000, or 4.1 per cent of the total project.



An interesting new electrical development is shown here, where Humble Oil & Refining Co. is handling 31 wells on an automatic flowing system. Each well is automatically flowed for the desired time interval, then shut down. Electrical switching of tanks is also done—when one tank is full, its inlet valve closes, and the next empty tank's inlet valve is automatically opened. Electrical liquid-level indication likewise is incorporated—an indicator on the ground beside the tank shows liquid level inside. Detailed engineering article on this installation appeared in the August 5, 1948, Journal, page 74

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Preparedness Warning

WASHINGTON.—Surveying the international situation as he left his post as director of the Oil and Gas Division, Max W. Ball last week warned the country not to overprepare for war.

Ball admitted that war might come next month, next year or 5 years from now, but on the other hand, he said, it might not come at all and in our anxiety to be ready for a conflict that didn't occur we might find ourselves with a thoroughly regulated economy, geared for war and incapable of coping with the problems of peace.

Those who are dealing with the problem of national preparedness, he cautioned, should also give thought to how not to prepare for a war.

"Two wars have been won by our vigorous and elastic economy," Ball pointed out. "American industry has been elastic and strong enough because it has been operating under a free competitive system.

"There is a very real danger that in our anxiety to get ready for the next war we may prematurely channel our industry and by so doing restrict it and lessen its vigor and elasticity."

Planning for preparedness is essential, he said, but the plans should be kept on paper and revised continuously in the light of developments, and not put into effect until an emergency occurs.

Emphasis today, Ball said, is upon the need for oil in the event of war, and that thinking might lead to the withholding of steel from the automobile industry in order that petroleum supplies might be built up. Then, in war, the country might find that greater automotive production is needed rather than more oil.

The best preventive of a planned economy is government-industry cooperation, with the Government planning for war and the industry free to expand and strengthen so as to be forceful and virile in the event war comes. And, he added, his experience in the federal service has been that the sentiment for controls is stronger outside the Government than within it.

Who Gets Steel

PRODUCERS and consumers of oil and gas, and all the people between them, constitute as a group a mighty important market for the steel manufacturers, according to no less an authority than the American Iron and Steel Institute.

The institute apparently maintains a pretty close check on the activities of the steel-consuming industries. At any rate it knows that the oil and natural gas industries plan to spend more than $10,000,000,000 to expand their facilities between now and 1952, which means their heavy demand for steel will continue.

According to the steel industry's figures, a lot of metal is going into the production and consumption of oil and gas. In the first 8 months of this year, the oil and gas industries received a tonnage of steel equal to 87 per cent of all they received for the year 1947 and are expected to receive a record-breaking more than 4,000,000 tons when the 1948 figures are totaled. Shipments of steep pipe and tubing totaled 4,410,000 tons during the 8-month period, an increase of 11 per cent over the same period last year, and approximately 23,500 miles of pipe lines have been placed in operation since the end of the war, the institute said.

For consumers, the steel industry expected to deliver steel for more than 6,000,000 motor vehicles this year. By the end of 1948 more than 5,100 diesel locomotives will be in operation. More than 2,000,000 oil burners have been produced since the end of the war. Over 2,000,000 automatic gas-fired heating systems and a similar number of unit and space heaters are in operation and more than 3,000,000 tractors are in use on farms.

No Urge to Merge

A PROPOSAL that some 60 agencies which now report directly to the President be merged into a half-dozen organizations, saving wear and tear on the Executive and $3,000,000,000 to the taxpayers, will be sent to Congress next month by the Hoover commission on organization of the government.

No changes would be made in the status of the regulatory agencies, such as the Federal Power Commission, Federal Trade Commission, and others which comprise part of the involved set-up with which the oil industry has to deal.

Former President Hoover, chairman of the commission, points out that if the President devoted only 1 hour a week to the affairs of each agency he wouldn't have much time for the more important affairs of state, but actually the executive branch is so complex that the President can give little or no attention to many of these agencies.

Reportedly, the Hoover commission is encountering the usual resistance to any reorganization that would deprive any department of any authority it now possesses. This has been particularly noticeable in its efforts to straighten out the muddled oil situation, where more than 30 different agencies are working—frequently at cross purposes.

All suggestions that civilian oil activities be centered in the Interior Department bring a lot of "yes but" answers emphasizing the importance of the oil interest held by Agriculture, Commerce, Labor, or other agencies. Actually, a recent count, which may not be complete so deeply secreted are some governmental activities, shows there are 14 branches of the Interior Department and 66 bureaus, agencies, and offices that have at one time or another sought advice or assistance from the Oil and Gas Division.

Groundwork for Congress

FEDERAL officials are making speeches all over the lot these days, and from the general tenor of their talks it looks as though they were laying the groundwork for the extensive legislative program which will be laid before Congress by President Truman next month.

In recent addresses, Budget Director James E. Webb disclosed that government spending in the next fiscal year will be higher than it is now and will necessitate increases in taxes; Economic Cooperation Administrator Paul G. Hoffman emphasized the necessity for and success of the European Recovery Program, and Secretary of Labor Tobin promised labor it would get satisfactory legislation. Other top-layer officials spoke on housing, synthetic fuels, and other matters on which the administration is expected to ask new laws.

Government spending during the current fiscal year is expected to top $42,000,000,000, but there appears to be general agreement in administration circles that it will jump at least $3,000,000,000 and quite likely more over the coming year. There also appears to be general agreement that the Government will wind up this year with a surplus but will definitely be in the red in 1950 unless taxes are increased.

An increase in corporation taxes seems inevitable, although it has not yet been settled whether this will be provided by raising present rates or

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by imposing an excess profits tax. The latter is favored by President Truman's advisers but important members of Congress have indicated their disapproval of a levy that would dam up the flow of venture capital, although willing to see the regular corporate levies increased.

Increases in individual income taxes are also in the cards, but probably will be held back so as not to take effect before January 1950.

Mothball Plants

MORE than $10,000,000 will be spent by the Federal Works Agency to set up a "national industrial reserve" which will consist of plants and equipment available for immediate use in the event of war.

FWA is operating under the provisions of legislation relating to the disposition of the surplus property held by the Government at the end of the war, consisting in part of plants deemed necessary to the national defense which have been or hereafter may be sold, leased, or otherwise disposed of, subject to the national security clause.

Its immediate objective, however, is the protection of industrial plants it has not disposed of, and it already has taken over a number of important facilities.

Most of the plants which have or will come to FWA have been closed for more than 3 years and have suffered considerable deterioration because of lack of funds for their maintenance. As a result, the cost of placing many plants in extended standby status will be greater than if they had been operated continuously or been put in "mothballs" properly.

An initial appropriation of $5,000,000 has been provided for this operation, with authorization to enter into contracts up to an additional $5,000,000. Where possible, plants will be sold, subject to the national security clause under which they are to be so maintained that they can be returned to their original purpose and capacity within 120 days.

No refinery or rubber facilities have been allocated to the industrial reserve in the hands of FWA, but the list includes aluminum, magnesium, chemical, and ordnance plants.

Kansas Standard Is Being Dissolved

HOUSTON.—Standard Oil Co. of Kansas is being dissolved as a result of action of its stockholders at a special meeting in Wilmington, Del.

Properties of the company are to be distributed to stockholders on a pro rata basis. C. B. Wrightsman, president of the concern, personally owns over 92 per cent of the company's stock.

The company maintains operating headquarters in Houston. Producing properties are located in the Texas Gulf Coast, East Texas, Southwest Texas, South Louisiana, and Oklahoma.

Companies Seek Easing Of Coast-Guard Rules

HOUSTON.—Oil company representatives this week proposed relaxation or elimination of certain coast-guard regulations which hamper their drilling operations in the Gulf of Mexico.

The proposals were made at a preliminary discussion in New Orleans between a three-man coast-guard board and 30 oil-company representatives. No decisions were made and the meeting, in general, was aimed at familiarizing the board with the problems of the oil industry in the Gulf.

Karl J. Christoph, Brown & Root, Inc., testified that some regulations are costing oil companies a great deal of money. He made a particular point of the fact that rules for small boats are the same as for freight and cargo coastwise vessels.

Thomas J. Pennington, Humble Oil & Refining Co., stated that "the oil companies have a good record of safety. If allowed some relaxation in crew requirements, the utmost safety precautions will be observed and periodic inspections could be made by the coast guard."

Members of the coast guard board are Capt. C. H. Peterson, Capt. Joseph A. Kerrins and Lt. Cmdr. Roderick Y. Edwards. The board will hold further meetings in Houston and Galveston on this matter. Meetings are scheduled with shipping interests and the Army engineers, and an inspection trip to some of the offshore drilling rigs near Grand Isle is planned.

Angell Named President Of Asphalt Institute

THE board of directors of the Asphalt Institute, which represents the major part of the petroleum-asphalt production industry of the United States and Canada, at its annual meeting in New York City December 1 elected N. H. Angell, Standard Oil Co. of California, president and chairman of the executive committee. Other members elected to the executive committee are A. M. Maxwell, Standard Oil Co. (Ohio); Sidney Goldin, Shell Oil Co., Inc.; D. H. Jenks, Jr., Ashland Oil & Refining Co.; E. E. Scholer, Shell; O. D. Bridges, Houston, Tex., and W. L. Spencer, Union Oil Co. of California.

N. H. ANGELL

The directors also elected five vice presidents with respective divisional jurisdiction as follows: Atlantic-Gulf, Goldin; Ohio - Great Lakes, Jenks; Mid - West, Scholer; Southwest, Bridges; and Pacific Coast, Spencer.

Bernard E. Gray was reelected general manager and chief engineer, and Herbert Spencer, secretary of the institute. George R. Christie, Socony-Vacuum Oil Co., Inc., was elected treasurer and John N. Smith, Socony-Vacuum, assistant treasurer.

Angell, who is manager of asphalt sales for his company, has served as chairman of the engineering and development committee of the institute's Pacific Coast division. During the past year he was chairman of the division and vice president of the national organization representing the Pacific Coast area. Angell is a native Californian, and graduated from the University of California in 1921.

Next Week

Gas-Well Spacing.—D. T. MacRoberts, Union Producing Co., Shreveport, discusses both the physical and economic aspects of this problem, gives analytical solution and computations to be followed to obtain maximum net income.

Drilling Muds, Physical Properties.—Paper by H. B. Fisher and P. G. Carpenter, research department, Phillips Petroleum Co.

Trouble Shooting on Compressor Problems.—From the Baton Rouge refinery, Esso Standard Oil Co., comes an article dealing with effective use of "open type" compressor indicator cards.

7,700-Bbl. per Day Movement of Cycling-Plant Products.—The Journal's pipe-line editor describes how Shell Oil Co., Inc.'s new 101-mile system delivers at this rate from its Sheridan cycling plant, Colorado County, Texas, to the company's Deer Park (Houston) refinery.

Flow Coefficients.—J. E. Loeffler and Dr. Frank N. Dotterweich discuss determination for positive flow beans, compared with U. S. Bureau of Mines procedure.

Accounting for the Drilling Contractor.—Analysis by Ralph U. Maddox, Big West Drilling Co., Dallas.

New Pressure Control Valve.—Interesting field application provides automatic emergency control of high pressures.

PERSONALS

Baumel to Leave Soon On Venezuelan Mission

JACK K. BAUMEL, who since early 1945 has served as chief engineer of the oil and gas division of the Railroad Commission of Texas, is leaving early this month on a year's leave of absence to set up a conservation department in Venezuela similar to the Railroad Commission's oil and gas division.

A native of Lucku, Poland, Baumel had no formal education when he came to the United States at the age of 11. Despite his relatively late start in formal schooling, Baumel was noted throughout his educational career for his high scholastic standing.

After graduating from high school in Illinois in 1930 he attended the University of Illinois for 1 year at which time he received a scholarship to the University of Texas. In 1936 he graduated from Texas in chemical engineering and the following year took a postgraduate course obtaining his master's degree in petroleum engineering.

While working on his master's degree, Baumel aided in research for the Railroad Commission. This and other research work led the commission to issue their order in 1939 classifying distillate producing wells as gas wells.

In June 1938 Baumel joined the commission being placed in charge of gas-oil ratio surveys and associated data in the state, as well as continuing research studies in gas-phase reservoirs. In 1938 he was made state engineer for the commission to obtain bottom-hole pressures, bottom-hole samples and gas-oil ratios.

Baumel was appointed chief enforcement officer of the oil and gas division of the Railroad Commission in 1941 and the following year was made director of production which position he held until January 1945 when he was made chief engineer of the oil and gas division.

The Railroad Commission of Texas is presently training seven Venezuelan engineers—all graduates of Oklahoma, Texas, and Tulsa universities.

C. S. COATES

Charles S. Coates, general superintendent of operations and construction for Tennessee Gas Transmission Co., has been made a vice president of the company. Coates' first experience in oil and gas operations was as a roughneck for Richardson Petroleum Co., Corpus Christi. He later joined Chicago Corp. where he became division superintendent and in 1943 joined Tennessee Gas as assistant to the vice president. In 1947 he was made general superintendent.

Robb Quinby, manager of the rate department of Brooklyn Union Gas Co., has been appointed chairman of the rate committee of the American Gas Association for the coming year.

Gerald J. LePine, of Transmission Petroleum Corp., was elected president of the Chicago Oil Men's Club at its annual meeting recently.

Norman J. McGaw, who joined Shell Oil Co., Inc., in 1925 as a clerk and by 1939 was named a vice president of the company, has been elected to the board of directors and assigned new duties. He will move from San Francisco to New York where he will organize and direct a new department dealing with economic studies of the oil industry in general, as well as with Shell's own forward planning and major development projects. Prior to his elevation to the vice presidency in 1939 McGaw was assistant to the president at St. Louis, Mo.

I. W. Hartman, president of Gordon Oil Co., has been named vice president of the Oil and Gas Association of Michigan for 1949. He takes the place of **James Foster** who was recently named president following the death of Theodore Bowler, the association's head. **C. F. Knollenberg,** Michigan general superintendent, Sun Oil Co., was elected as Sun's representative on the association's board of directors.

Foreign guests attending the Los Angeles chapter of Nomads' November meeting at which "Results of Oil Operations in Canada" was the subject of discussion: (Seated) R. L. Jewell, V.O.C. Shell of Venezuela; C. L. Rynd, Texas Petroleum Corp., Venezuela; R. H. Deem, Shell Oil Co., Inc.; and Charles R. Massy, Neal & Massy Engineering Co., Ltd. (Standing) William Wallis, Creole Petroleum Corp.; V. E. Duclos, of the Canadian Government; S. W. Evinger, Socony-Vacuum Oil Co., Inc.; and A. E. Rose, Neal & Massy Engineering Co., Ltd.

Continental Officials Meet to Formulate 1949 Operations

EXECUTIVES and officials of Continental Oil Co. held a 10-day, mid-November conference at the Hotel Broadmoor, Colorado Springs, Colo., to discuss 1948 operations and to formulate an operating program for 1949 and a budget of capital expenditures for the first half of 1949. The conference was followed by a meeting of Continental's board of directors. Most of the group, shown in the picture above are:

(Front row)—J. R. Cunningham, southern sales manager, Fort Worth; F. M. Clement, assistant region manager, production, Denver; C. D. Hull, assistant to the manager, manufacturing, Ponca City; L. W. Vickery, refinery superintendent, Ponca City; Prof. John G. McLean, Harvard Business School, Boston; T. O. Duller, assistant chief engineer, Ponca City; C. B. Round, clerk, manufacturing, Ponca City; Mrs. Blanche Hatfield, secretarial staff, Denver; Mrs. Claribel Irvine, secretarial staff, Denver; Mrs. Mary O'Gara, secretarial staff, Denver; Mrs. Betty King, secretarial staff, Denver.

Mrs. Alma Mooney, secretarial staff, Ponca City; Mrs. Catherine Riley, secretarial staff, Denver; J. H. Smith, chief process engineer, manufacturing, Ponca City; J. A. Ramsey, refinery superintendent, Billings; A. E. Brainerd, division geologist, Denver; J. P. Downer, analyst, coordinating and planning department, Ponca City; L. T. Cramer, assistant, general sales manager, marketing, Ponca City; E. J. Sheldon, assistant treasurer, Ponca City, and G. T. Bodman, assistant controller, Ponca City.

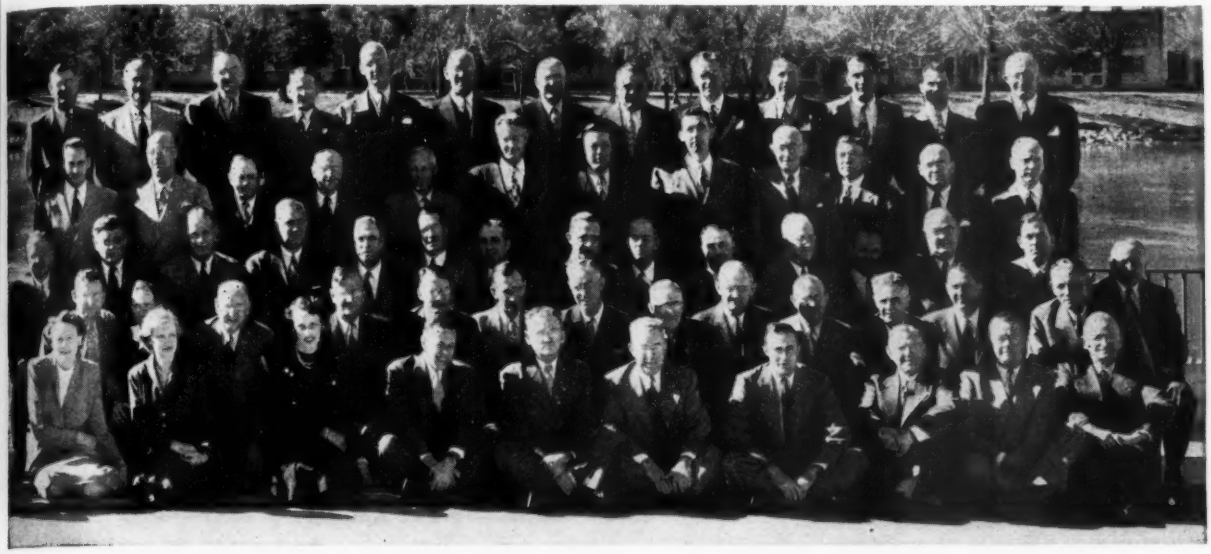
(Second row)—E. W. Webb, assistant manager, production, Ponca City; L. L. Aitken, Jr., executive assistant to W. H. Ferguson, Denver; J. R. Bailey, superintendent of development, natural gasoline and gas, Ponca City; Paul Rawdon, refinery superintendent, Glenrock, Wyo.; D. R. Johnson, southern region superintendent, manufacturing, Ponca City; A. M. Zuvanich, chief clerk, production, Ponca City; H. H. Kinnaird, refinery superintendent, Farmington, N. M.; G. H. Lovejoy, superintendent, order and distribution division, marketing, Ponca City; J. H. Olehy, director, technical services, manufacturing, Ponca City; Charles Morrill, secretary to J. J. Cosgrove, Ponca City.

Glenn H. Bowes, chief geologist, Hudson's Bay Oil & Gas Co., Ltd., Calgary, Canada; J. E. Fenex, western region refinery superintendent, Denver; H. R. Prescott, chief geophysicist, Ponca City; Jay Ruckle, technologist, manufacturing, Denver; R. M. Barnes, region geologist, Los Angeles; E. E. Gillespie, refinery superintendent, Artesia, N. M.; H. R. Wall, refinery superintendent, Lake Charles, La.; E. W. Kimball, division geologist, Houston; J. A. Bruso, traffic representative, Denver; W. E. Haggard, manager, land department, Ponca City; G. C. Clark, chief geologist, Ponca City; Russell M. Hunter, chief clerk, production, Ponca City; C. J. Mooney, accountant, general accounting, Ponca City; Prof. George Albert Smith, Jr., Harvard Business School, Boston, and Dr. W. O. Armstrong, chief surgeon, Ponca City.

(Third row)—T. A. Van Griethuysen, manager, crude oil trading department, Ponca City; C. M. Reed, division marketing manager, Houston; M. H. Dubrow, chief petroleum engineer, production, Ponca City; H. R. Richards, assistant superintendent, order and distribution division, marketing, Ponca City; C. D. Carlson, division marketing manager, Chicago; J. W. Liddell, eastern sales manager, New York City; Dr. L. F. Athy, manager, geophysical department, Ponca City; J. A. Lentz, western sales manager, Denver; Millard K. Neptune, industrial engineer, production, Ponca City.

L. L. Davis, development and research, Ponca City; S. B. Jurenev, secretary and manager, coordinating and planning department, New York City; Charles A. Perlitz, Jr., vice president, Houston; W. H. Ferguson, executive vice president, Denver; L. F. McCollum, president, Ponca City; Harry J. Kennedy, vice president in charge of marketing, Ponca City; H. G. Osborn, vice president in charge of manufacturing, Ponca City; W. C. MacMillan, vice president in charge of production and drilling, Ponca City; E. F. Battson, vice president, New York City.

Stuart Clark, chairman, exploration committee, Ponca City; T. F. Dowd, Jr., controller, Ponca City; R. C. Brown, vice president and general manager, Hudson's Bay Oil & Gas Co., Ltd., Calgary, Canada; W. C. Stout, assistant manager, land department, Houston; John W. Cram, superintendent, land department, Ponca City; W. B. Boyd, division geologist, Fort Worth; L. P. Carpenter, region



manager, production, Ponca City; W. E. Landrum, region petroleum engineer, production, Ponca City; L. E. Teverbaugh, general auditor, controller's department, Ponca City; A. W. Tarkington, treasurer, Ponca City, and Emerson G. Smith, supervisor, publications department, Ponca City.

(Fourth row)—H. H. Hinson, chief production research engineer, Ponca City; G. M. Sullivan, division marketing manager, Richmond; O. B. Lloyd, general sales manager, Ponca City; Frank Searcy, superintendent, geophysical department, Ponca City; F. B. Haverfield, manager, natural gasoline and gas division, Ponca City; George J. Woods, director, sales operations, Ponca City; C. L. Arnett, division geologist, Ponca City; J. M. Crawford, superintendent, geophysical department, Ponca City; W. R. Fitzpatrick, division marketing manager, Lincoln; L. C. Harsh, general accountant, Ponca City; O. L. Fisher, region manager, production, Houston; E. C. Redd, assistant advertising manager, Ponca City; J. L. Wait, northern sales manager, Chicago.

W. A. Morgan, advertising manager, Ponca City; G. D. Helzer, accountant, controller's department, Ponca City; M. H. Shanahan, assistant manager, production and drilling, Ponca City; W. L. Kygar, assistant manager, motor transportation, Ponca City; J. H. Graham, assistant manager, production, Houston; J. C. Johnston, region manager, production, Denver; G. T. Pearson, general production superintendent, production, Los Angeles; D. W. Sims, assistant manager, pipe line division, Ponca City; Fletcher Emerson, assistant to L. F. McCollum, Ponca City; P. H. Kuhns, manager, traffic division, Ponca City; V. D. Arntzen, assistant chief, tax division, Ponca City; R. B. Sale, assistant to region manager, production, Ponca City, and H. L. Johnston, assistant manager, production, Fort Worth.

(Fifth row)—D. D. Christner, assistant chief geologist, Ponca City; Pete Dominic, assistant director, sales administration, marketing, Ponca City; H. B. Hurley, region manager, production, Fort Worth; L. R. Kump, division marketing manager, Salt Lake City; E. S. Karsted†, Jr., manager, export sales, New York City; E. A. Williford, division marketing manager, Ponca City; R. W. Hird, assistant director, sales operations, marketing, Ponca City.

E. F. Shannon, manager, railway sales division, Chicago; S. D. Breitweiser, manager, bulk lube oil sales, Ponca City; J. H. Snyder, director, market research, Ponca City; S. J. Larson, division marketing manager, Albuquerque, N. M.; M. E. Clawson, chief engineer, Ponca City; P. W. Riggins, division marketing manager, Fort Worth; E. C. Walter, division marketing manager, Kansas City, Mo.; B. G. Swan, superintendent, geophysical department, Ponca City; C. R. Allen, region manager, production, Los Angeles; J. W. Flynn, director, sales administration, marketing, Ponca City.

F. W. Mann, eastern superintendent, order and distribution division, marketing, New York City; P. M. Hirth, division marketing manager, Denver; T. H. Menke, division marketing manager, Butte, Mont.; H. A. Bowles, division marketing manager, Los Angeles; W. G. Carlile, superintendent, land department, Houston; Olen Lane, region land man, Los Angeles; K. W. Brill, superintendent, land department, Denver; J. P. Mallott, assistant region manager, production, Houston; J. S. Royds, regional geologist, Denver, and T. M. Cady, district land man, Fort Worth.

Willard W. Wright, chairman of the Oil Industry Information Committee for the New England district, has announced the following six state chairmen of the O.I.I.C. in New England: **F. B. McConnell,** district manager for Gulf Oil Corp., succeeds **C. A. Sheehan,** sales manager of Socony-Vacuum Oil Co., Inc., for Rhode Island; **James L. McIntyre,** president of Laurel Oil Co., succeeds **Carl E. Small,** Tide Water Associated Oil Co., for Connecticut; **Frank J. Meade,** district representative for The Texas Co., succeeds **George H. Stuart,** district manager for Esso Standard Oil Co., for Vermont; **Meldon F. Rice,** district manager for Shell Oil Co., Inc., succeeds **Harold H. Eubank,** The Texas Co., for New Hampshire; **Raeburn B. Smith,** district representative of Gulf Oil Corp., continues as chairman of the O.I.I.C. of Maine; and **Thomas F. Walsh,** assistant manager of sales for The Texas Co. in New England, succeeds **E. J. Pease,** manager of industrial sales for Sun Oil Co., for Massachusetts.

Jeb B. Maebius, Gulf Oil Corp., has been elected president of the Wyoming Geological Association. Other officers named were: **Emmet E. Schieck,** Sohio Petroleum Co., first vice president; **Donald E. Edstrom,** British American Oil Producing Co., second vice president and program chairman; **George L. Goodin,** Petro-

PERSONALS

leum Information, treasurer; and **J. B. Headley, Jr.,** Atlantic Refining Co., secretary.

J. W. Pittman, manager of the Shell Oil Co., Inc., production division at Lake Charles, La., has been named

J. W. PITTMAN

W. C. GORDEN

general superintendent of the company's area production staff. Also added to the area staff were **G. Stewart** as area reservoir engineer and **J. W. Watson** as subsurface engineer. **W. C. Gorden,** district superintendent at Houma, La., for Shell, has been named manager of the company's new Franklin division. **H. F. Winham,** formerly district superintendent at Donaldsonville, has been named head of the newly created Donaldsonville division. **W. E. Owen,** division exploitation engineer at Lake Charles, succeeds Pittman as manager of the Lake Charles division.

Alec M. Crowell, petroleum consultant and producer, Shreveport, La., has opened a branch office at 1415 Carondelet Building, New Orleans, where he will be located the first 5 days of the last full week of each month during 1949 for consultation on natural-gas matters peculiar to South Louisiana and South Mississippi.

D. C. Baker, district superintendent, Rocky Mountain division at Casper, Wyo., for The Texas Co., has been named division superintendent of drilling and production for the Rocky Mountain division. He will succeed **James F. Blackwell,** who has been advanced to assistant division manager at Denver. Baker joined The Texas Co. in 1928 after having worked for Mammoth Oil Co. and Mid-West Refining Co. Prior to his becoming district superintendent late this year he was field foreman in the Rangely field in the Colorado Rockies.

Carl Wender, supervisor of state land leases for the lands division, department of conservation for Michigan, has resigned to join the land and title department of Sun Oil Co. at Mt. Pleasant. **Joseph Stephansy** has been named to succeed Wender as supervisor of state land leases at Lansing, Mich.

SHIFTS—

C. E. McCreight, Jr., geologist, Carter Oil Co., Manhattan, Kans., to Purcell, Okla.; **H. C. Brown,** superintendent, Phillips Petroleum Co., Goodwell, Okla., to Eureka, Kans.; **O. C. Atkinson,** engineer, Cities Service Oil Co., Oklahoma City to Graham, Tex.; **William R. Franey,** engineer, Stanolind Oil & Gas Co., Oklahoma City to Tulsa.; **Thomas M. Miller, Jr.,** engineer, Stanolind Oil & Gas Co., Wewoka, Okla., to Oklahoma City; **Frank Winfrey,** engineer, Oklahoma Natural Gas Co., Wewoka, Okla., to Tulsa.

Fred A. Sherwood, engineer, Monsanto Chemical Co., Dickinson, Tex., to Galveston; **C. M. Carothers,** engineer, Humble Oil & Refining Co., Houston to Mobile, Ala.; **C. R. La Rue,** engineer, Phillips Petroleum Co., Odessa to Terminal, Tex.; **David Johnston,** engineer, Humble Oil & Refining Co., Refugio, Tex., to Houston; **Lawrence W. Coldren,** foreman, Pure Oil Co., San Angelo to Mineola, Tex.

Norman A. Koneman, Jr., engineer, Pan American Refining Corp., Texas City to La Marque, Tex.; **J. R. Whiteman,** engineer, The Texas Co., Houma to New Orleans, La.; **W. C. Dickson,** geologist, Atlantic Refining Co., Beatrice to Grove Hill, Ala.; **F. H. Rathjen,** engineer, Shell Oil Co., Inc., Edwardsville, Ill., to Minneapolis, Minn.; **R. A. Houge,** engineer, Sinclair Refining Co., Hammond, Ind., to East Chicago; **R. B. Hoback,** superintendent, Rock Island Refining Co., Granville, Ohio, to Huntington, W. Va.; **Warren L. Morris,** foreman, Socony-Vacuum Oil Co., Inc., Hallowell to Lewiston, Me.

George E. Carver, geologist, Kerr-McGee Oil Industries, Inc., Grand Junction, Colo., to Dumas, Tex.; **Byron W. Berthelot,** engineer, Phillips Petroleum Co., Eurepa, Kans., to Odessa, Tex.; **James J. Williams,** engineer, Cities Service Oil Co., Moore to Bartlesville; **John D. Bowers,** foreman, Interstate Oil Pipe Line Co., Drumright, Okla., to St. Elmo, Ill.

David Goodwill, engineer, Standard Oil Co., of California, Bellflower to Whittier, Calif.; **Gordon Kiddoo,** superintendent, The Texas Co., Montebello, Calif., to New York.

DEATHS

Dr. Karl G. Hochschwender, 65, consulting chemist for Southern Natural Gas Co. and associated with the company the last 3 years in experiments on the gasification of coal conducted with the U. S. Bureau of Mines, died November 30 while en route to Pittsburgh, Pa. His home was in Scarsdale, N. Y.

E. M. Eckhart, 52, executive vice president in charge of carbon black and oil and gas divisions in Texas for J. M. Huber Corp., died November 28 in Amarillo, Tex. He had been with the oil company for 20 years and was in charge of its operations with headquarters in Borger, Tex.

A. Smith Dunnington, 79, pioneer drilling contractor and oil producer who had been active in oil development in Ohio, Indiana, Illinois, Kansas, Oklahoma, and North Texas, died December 5 in Tulsa.

James D. Grant, 65, a civil engineer for Humble Oil & Refining Co., died December 1 in Houston.

Sterling D. Tooke, 91, pioneer oil operator, died recently in Humble, Tex.

Lee C. Harrison, 52, president of Prairie Oil & Gas Co., Dallas, Tex., was killed in an automobile accident November 30 in Austin, Tex. He was an early developer of the Howard Glasscock pool in 1926 and the East Howard fields near Big Spring, Tex., in 1931.

G. Gordon Brownell, 64, manager of the tax department of Cities Service Oil Co. and associated with the company since 1910, died November 30 in Westfield, N. J.

Charles Popp, 43, lubrication engineer with The Texas Co. in New York since 1945, died November 26 in New York.

Thomas Simpson Holt, 76, founder of Holt Oil Co., died November 21 in Federalsburg, Md.

Ralph A. Brakey, 54, who had formerly been associated with Shell Oil Co., Inc., and Barnsdall Oil Co., as gasoline engineer, died November 26 near Poca City, Okla.

Emmet Lee Merry, 79, retired oil operator of Oklahoma, died December 1 in Tulsa.

Leonard P. Ellis, 43, part owner of American Oil & Gas Co. and Rotary Oil Co., died November 29 in Dallas, Tex.

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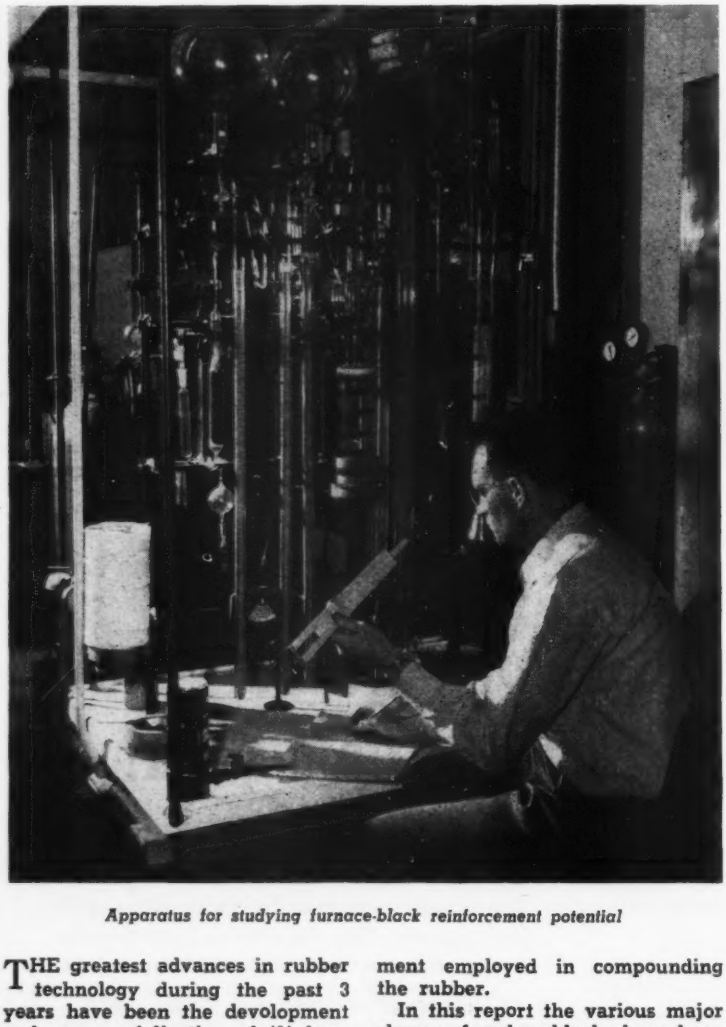
New Synthetic Rubber and Oil-Type Carbon Black Make the Best Tires

by L. R. Sperberg, L. A. Bliss, and C. C. Biard



Apparatus for studying furnace-black reinforcement potential

THE greatest advances in rubber technology during the past 3 years have been the devolopment and commercialization of (1) low-temperature rubber and (2) of high-abrasion furnace-type carbon black. The first large-scale pilot-plant production of this new type of rubber was accomplished by Phillips Petroleum Co. which produced and tested various butadiene-styrene copolymers prepared by emulsion polymerization at temperatures as low as 0° F. While the performance of various low-temperature rubbers has been very outstanding, the improvement in performance characteristics has been influenced to varying degrees by the type of reinforcement pigment employed in compounding the rubber.

In this report the various major classes of carbon blacks have been investigated in 41° F. rubber (Philprene* A) and compared to similar loaded black compounds prepared from G.R.-S. and smoked sheet natural rubber. Road tests on these elastomer - carbon black compositions show that Philprene A reinforced with HAF black is substantially better in abrasion resistance than top-quality natural rubber-channel black tread compounds while still maintaining excellent resistance to cut and crack growth.

The authors are with Phillips Petroleum Co., Bartlesville, Okla.

UP until as recently as a year ago very few people expected G.R.-S. synthetic rubber to remain in the American economy except by government subsidy—and then only as a preventive measure against a possible shortage of rubber in time of war. Today the situation has been completely reversed. Very few people who possess the facts of the situation doubt that the American synthetic-rubber industry is here to stay, not by reason of governmental directive, but by virtue of the ability of the newly developed low-temperature chemical rubber to compete on a quality and price basis with natural rubber.

The history of Phillips Petroleum Co.'s part in the development of the low-temperature chemical rubber has been given elsewhere and need not be repeated here.[1,2,3] The success of Philprene A and Philprene B (butadiene-styrene emulsion copolymers polymerized at 41° F. and 14° F., respectively) in passenger-car and truck tire-service applications has been outstanding and tremendous interest has been professed in these elastomers.

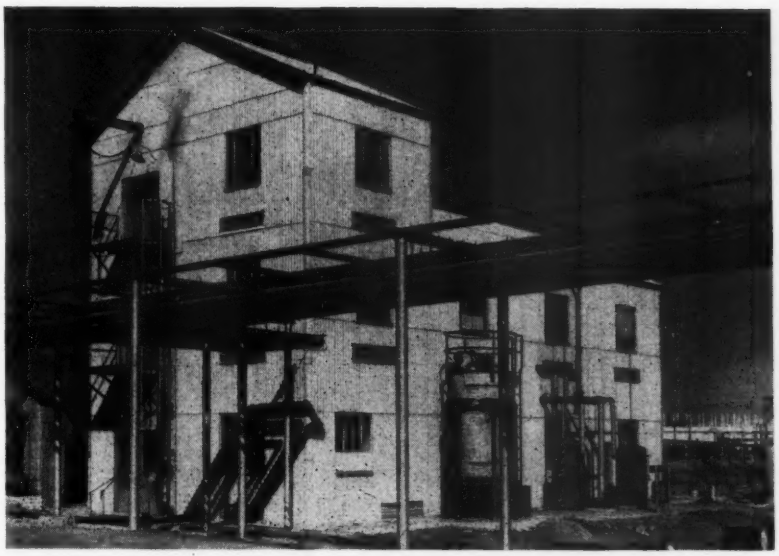
The development of the new HAF black (Philblack* O) has been no less outstanding in importance and in performance records than the development of the low-temperature chemical rubber.

More than 10 years ago Phillips began a program of basic research aimed at the development of a process to produce carbon black. This program included, among other things, a digression from the long-practiced use of natural gas in the old channel-black process to the use of oil as a raw material. This research work on blacks was initiated because it was felt that the very low efficiency of the channel - black process, which converts only about 3 per cent of the carbon in the gas to black, would eventually meet critical competition from processes with higher degrees of efficiency. The Philblack process which resulted from this research work has shown efficiencies in excess of 50 per cent. The use of oil in this novel process led to blacks with unusually good properties for compounding with synthetic rubber, both in factory handling and ultimate quality of the tires.

*Trademark of Phillips Petroleum Co.

While Philblack A, the first commercially produced material of this kind, did not equal channel black in ultimate reinforcement properties, it did possess a reinforcement potential ranging from 85-90 per cent of that of channel black which, when coupled with its excellent processing properties, high resilience, and good flex life, made this black an immediate commercial success. Coincident with the low-temperature chemical-rubber development, a new furnace black was being developed that was not just an equivalent of channel black but was actually from 10 to 20 per cent more reinforcing in character than channel black.

This black, Philblack O, and an HAF type, was "tailor made" for the low-temperature chemical rubber in that the combination of the two materials gives compounds having a higher reinforcement potential than the best prewar natural rubber-channel black compounds. The chemical and physical properties of the Philblack carbons have been discussed elsewhere and need not be considered here[4] while the general properties of Philblack O in G.R.-S. and natural rubber at certain selected loadings have also been reported.[5]



Exterior view of Phillips' synthetic-rubber pilot plant at Phillips, Tex.

Processing Characteristics

Processing characteristics of Philprene A in comparison to natural and to G.R.-S. rubber were investigated using the Midget banbury technique described previously.[6] These test data show that Philprene A, even at zero softener loading, incorporates the carbon black more rapidly than either natural rubber or G.R.-S. In addition, the extrusion rates and ratings are considerably improved over the values obtained for either natural rubber or G.R.-S. while the degree of swelling is approximately equivalent to that possessed by G.R.-S. The relative performance of Philprene A in comparison to G.R.-S. and natural rubber will naturally vary depending upon the type of formulation, the degree of premastication of the natural rubber, and the extent of mixing of the compounding stock.

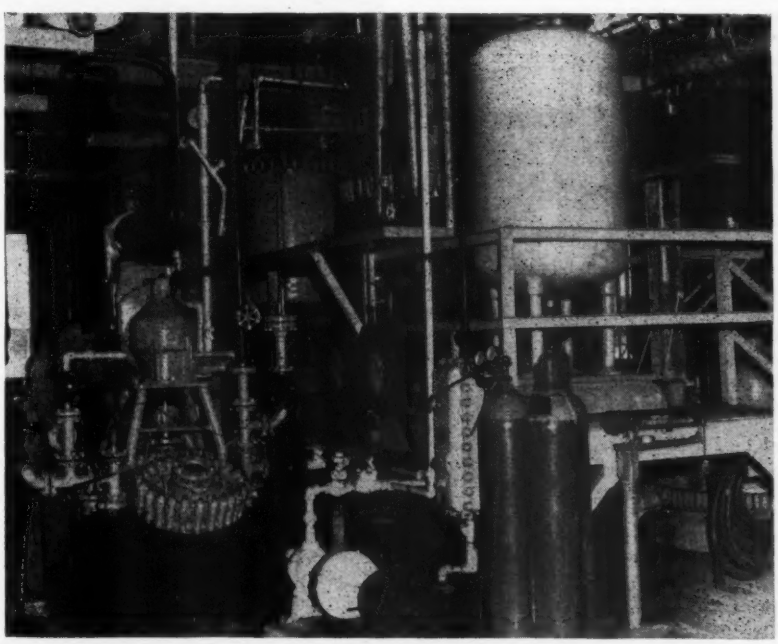
In order to get a comparison of the processing characteristics of different types of carbon black in Philprene A, similar mixing work was undertaken in which representative blacks of several major black classifications were compared. The two Philblack carbons incorporate more rapidly into the elastomer than the other carbon pigments although one would normally surmise that the "softer" carbons might be worked in more rapidly. Upon extrusion, the swelling tendencies of the reinforcing blacks were all similar which is rather surprising since in G.R.-S. the Philblack carbons generally swell considerably less than other blacks tested. However, the extrusion rate and the extrusion ratings show the faster and smoother extrusion characteristics of the Philblack carbons.

The reinforcement characteristics of Philprene A in comparison to G.R.-S. and natural rubber and of Philblack carbons in comparison to easy processing channel black (E.P.C.), semi-reinforcing furnace black (S.R.F.), and fine thermal (F.T.), carbon blacks were determined in a compounding evaluation in which the three elastomers were reinforced with each of the five carbon blacks at variable loadings. The results of this study may be summarized as follows:

Stress-strain properties.—In general, Philprene A possesses a much higher elongation than G.R.-S. which in some cases is actually higher than the elongations obtainable with the comparable natural rubber compounds. The carbon blacks line up in tensile strength in G.R.-S. and Philprene A in the order of their known reinforcement properties. Philprene A shows less degradation of properties after aging than does G.R.-S. or natural rubber.

Hysteresis.—Per cent resilience test values show that Philprene A has a lower hysteresis loss than G.R.-S. but a higher loss than natural rubber. Although these data may seemingly

(Continued on page 108)



Interior of Philprene pilot plant showing top of refrigerated reactor and auxiliary polymerization equipment

Tripod Derrick Widens Scope Of Portable Servicing Unit

Right: The Slater 94-ft. derrick will stack in doubles, 9,500 ft. of 2⅞-in. tubing, 12,000 ft. of 2⅜-in. tubing, or 6,000 ft. of 3½-in. drill pipe. The double board and the adjustable brace below, serve to tie the mast securely to the two helper legs. When pictured, the rig was handling 5,600 ft. of drill pipe on a deepening job at Placedo. Above: As in this deepening job, a substructure of sufficient height to clear blowout preventer may be used. The two auxiliary legs of the derrick (right) are spread 16 ft. apart, and the well head, immediately beneath the crown block, is about 6 ft. from the mast base

by D. H. Stormont

A VERSATILE combination light rig and servicing unit capable of handling heavy workovers, deepening jobs, and moderate drilling assignments is receiving steady demand for use in the field of the Texas Lower Gulf Coast. Its designer, H. W. Slater of Slater Well Service, Victoria, Tex., now has two such mobile units in current operation. The owner's modification to the standard portable mast unit meet his specific needs for improving efficiency and extending his scope of operation to include drilling and deepening contracts.

The rig comprises a 94-ft. mast, an Ideco H-30-S draw works equipped with air clutches and a torque converter, and an HPS supercharged 165-hp. Cummins diesel engine; all mounted on a 10-ton White tandem truck and Kingham tandem trailer. Separately loaded are the Emsco 7¼ by 12-in. mud pump, its prime mover, another Cummins diesel, the 17¼-in. oil-bath rotary, and other major equipment items.

The feature of the rig is its tripod derrick. The principal member, a trailer-mounted mast fabricated from 13⅜, 11¾ and 9⅝-in. heavy seamless J-55 casing, telescopes twice to form a compact load in transit. When rigging up, this mast is converted to a tripod derrick by addition of two helper legs made of tool-jointed 6⅝-in. drill pipe.

Legs Pinned with Lock Sleeves

The legs are pinned with lock sleeves to the specially designed crown assembly at the top of the mast. The three members are further tied together at the pipe rack or double-board and an adjustable telescoping brace, both designed and fabricated locally. Additional stability is afforded by bracing the helper legs with 1-in. rods forming a cross below the pipe rack and a V-door from the base of the legs to the adjustable brace located at half the height of the double-board. Guying is provided as protection against very strong winds. The result is a stable derrick which has handled hook loads up to 150,000 lb.

The entire assembly is designed to reduce time on location. It is readily rigged up and torn down. Further, by providing for the stacking of doubles in the derrick, the unit greatly expedites round trips with tubing or drill pipe. Rigging up requires no additional crew or truck. Once on location, the mast is raised and extended with a low-gear, high-power drum on the draw works. The same drum is used for stripping the tree and placing blowout equipment, substructure, or rotary table, and a cat line is never used.

Lines and blocks remain strung on the mounted mast during movement. When the mast is raised and locked, the traveling block is used to raise and secure each helper leg in position. Pipe rack and adjustable brace are then raised into the tripod and pinned to all legs. The two back legs

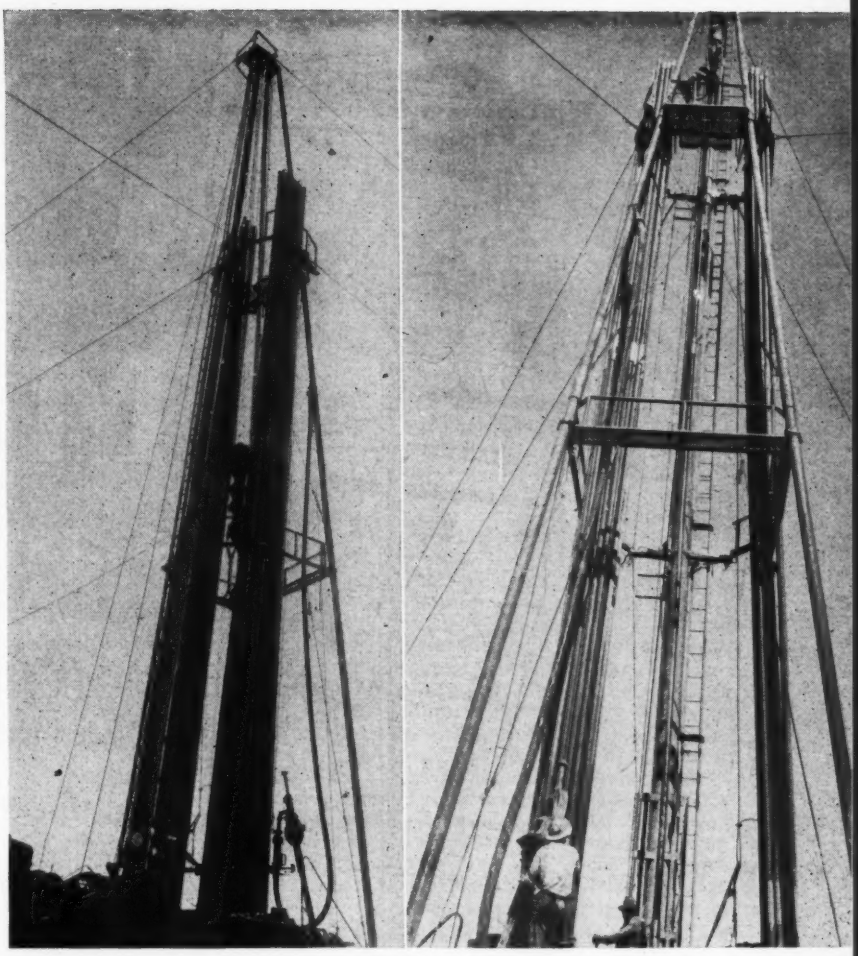
of the derrick are based on a matting foundation and leveled with leg screws, thus allowing the use of a substructure of any desired height, within limits. The derrick is guyed with four lines from the crown and four from the pipe rack.

Frames of both the pipe rack and the derrick brace are made from 3 and 4-in. pipe stock. The bracing member telescopes from a maximum width of 10½ ft., to 8 ft. for moving. Commonly, the two helper legs of the derrick are based 16 ft. apart, each being about 17 ft. from the base of the mounted mast. The tripod is set over the well so that the crown assembly, directly above the well head, is displaced horizontally, 6 ft. from the mast base and about 12 ft. from each auxiliary leg. As the mast stands more nearly vertical, and as both the dead line and the fast line come off the crown block on the mast side, total load is distributed about 60 per cent to the mast and 20 per cent to each leg.

One helper leg is made up to serve as the mud standpipe. The pump discharge header connects at the base and the hose takeoff is located at a height of 48 ft. If desired, a regular standpipe can be clamped to one leg.

In a traveling position, the truck-trailer mounted load conforms to permit width, and measures 12 ft. 4 in. to the tip of the folded crown assembly, giving ample clearance for any underpasses of the area. Without racks and legs, which like the pump assembly move in a separate load, the unit shows a gross weight of 70,000 lb. including the diesel truck and tandem trailer. Time for total displacement cross country, including tearing down, moving, and rigging up, figures well under the average for a portable rig, according to the owner. With one crew and no additional truck, the unit on the average can be moved, rigged up, and making mud in pits in 12 hours.

The first of the two units was assembled in 1945 and tested on a wide variety of jobs before the second was built. The two rigs have been used on numerous jobs in the Lower Gulf Coast and Houston areas. The heaviest workover job required the pulling and rerunning of 9,200 ft. of 2½-in. tubing in a Lower Gulf Coast field. Among the deepening jobs was a Placedo well, where screen was pulled and the hole drilled from 4,700 to 5,600 ft. with 3½-in. drill pipe. In Keeran Ranch field one unit was used to drill a well from surface to 4,200 ft. using 3½-in. drill pipe.



Left: One of the helper legs, extreme right, doubles as a standpipe in drilling jobs. The deadline is so strung that weight indicator is in constant view of the driller. The rig is equipped with air controls and a torque converter. Right: This derrick view shows details of the pipe rack, the adjustable brace, and the cross bracing and guying which make the unit unusually stable. Fixed to the mast, center, is a telescoping ladder

The 10-wheel diesel truck and 8-wheel tandem trailer handle the bulk of the rig. Pump and prime mover, pipe rack, derrick brace member, and the two auxiliary legs are moved separately. The unit can be moved and rigged up for drilling in about 12 hours

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PART 2

FRACTIONATING COLUMN Instrumentation

by Glenn W. Wilson*

Temperature vs. Material Balance Controls

IT has been the author's experience that each new process system is a new control problem, and a rather detailed study of all of the variables should precede the selection of a control system. For this reason comparison of temperature and material-balance control systems will be avoided, and some of the good features of both types of control shown.

Fig. 1 outlines the process flow employed at Humble's Baytown naphtha fractionation units (N.F.U.) for the segregation of cyclohexane concentrate. Cyclohexane, which boils at 177° F., is one of 12 hydrocarbons boiling in the 150°-200° F. range and here the fractionating problem is the recovery of a concentrate containing a minimum of 85 per cent cyclohexane. The equipment consists of four 12-ft.-diameter 50-plate towers and the associated gas-fired reboilers. All four towers are operated on temperature control with the control tray temperature, as measured by a resistance thermometer, setting a rate-of-flow controller on the reflux stream.

Fig. 2 details the complete instrumentation of column 4, the cyclohexane tower. Here the temperature on the forty-fourth tray sets the reflux, the pressure controller actuates the release valve in the natural-gas repressuring system, and the fuel gas to the reboiler furnace is on rate-of-flow control. The use of a narrow-range temperature controller (150°-230° F.) permits accurate control of the cut tray temperature to ±⅛° F. (when the instrument is tuned in properly). Fig. 3 and 4 present a portion of the strip chart from the T.R.C., and the associated flow-meter chart on the reflux stream. This is not a matter of having everything lined out for one happy moment, but, as evidenced by the 24-hour reflux chart, is the type of control maintained throughout the September 10-20, 1948, cyclohexane run. When one stops to consider that the cyclohexane column is the end column in a series of four and that there was enough change in feed-stock composition to vary the production rate by a matter of 30 to 40 per cent, it is seen that intermediate tray temperature control is quite satisfactory for this type of superfractionation operation.

So far we have made a good case for temperature control, but what about material balance? The example selected is the solvents operation discussed previously (Fig. 1, page 63, Journal issue of December 2, 1948). This operation utilized a portion of the equipment used for cyclohexane, but here only two towers are used in series and the operation is directed toward the production of a line of narrow-cut aliphatic solvents. As you examine Fig. 5, which details the instrumentation employed for this operation, you may wonder why we don't use those "superdooper" ⅛° temperature controllers just boasted about. The answer to that is, we probably would if we could but it so happens that the temperature level in this operation is above the 150°-230° F. range of the present temperature controllers. As a result, the instrumentation was set up to permit withdrawal of a fixed quantity of overhead product with the reflux stream

*Senior chemical engineer, technical service division, Humble Oil & Refining Co., Baytown, Tex.

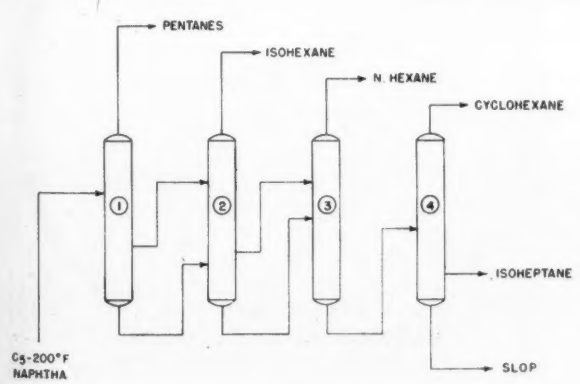


Fig. 1—Cyclohexane operation—process flow

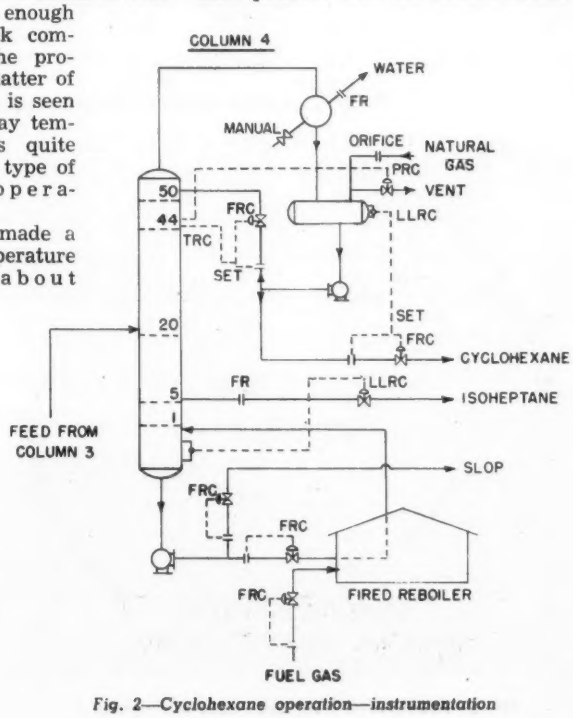


Fig. 2—Cyclohexane operation—instrumentation

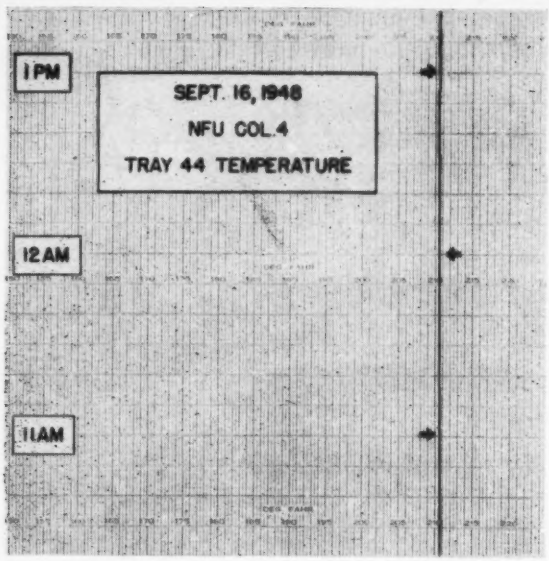


Fig. 3—Cyclohexane operation—control-tray temperature

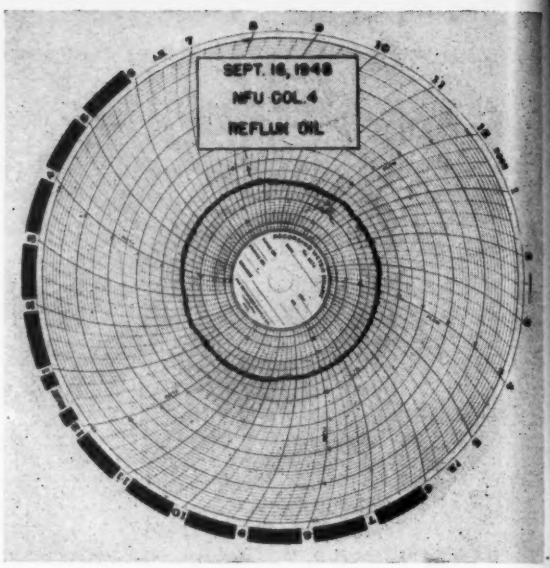


Fig. 4—Cyclohexane operation—reflux oil

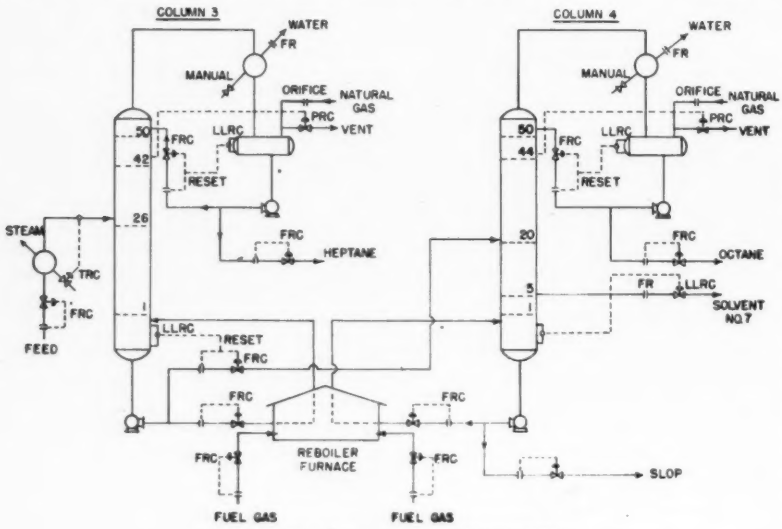


Fig. 5—Solvents operation—instrumentation

on accumulator liquid-level control. The bottoms stream from the second column is also on rate-of-flow control with the lower side-cut stream on bottoms liquid-level control.

This type of instrumentation is of course best suited to operations in which there is little or no variation in charge stock. As mentioned before, the 80,000-bbl. tank ahead of the units is equipped with mixers, and we are able to attain absolute uniformity in charge-stock composition.

Figs. 6 and 7 present typical product accumulator liquid level and reflux charts from the August 1948 solvents run. At the start of a run the overhead product rates were set on the basis of a laboratory evaluation of the charge stock and after a few minor adjustments were held constant for the remainder of the 5-day run. Excellent control of product quality was maintained throughout

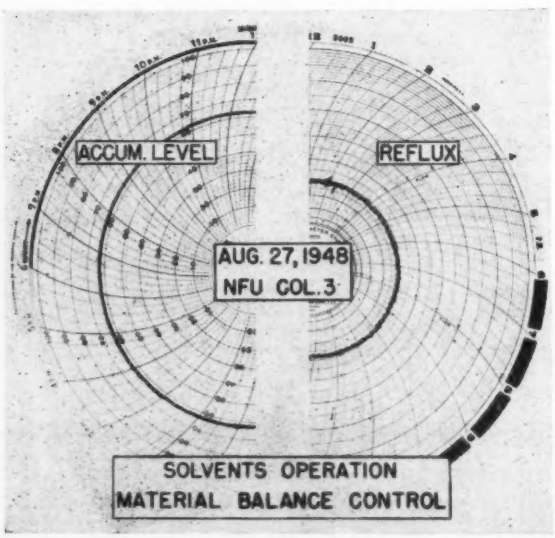


Fig. 6—Accumulator level and reflux oil—column 3

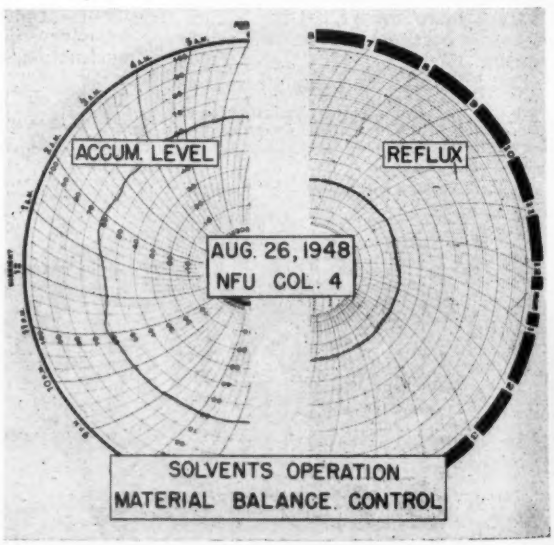
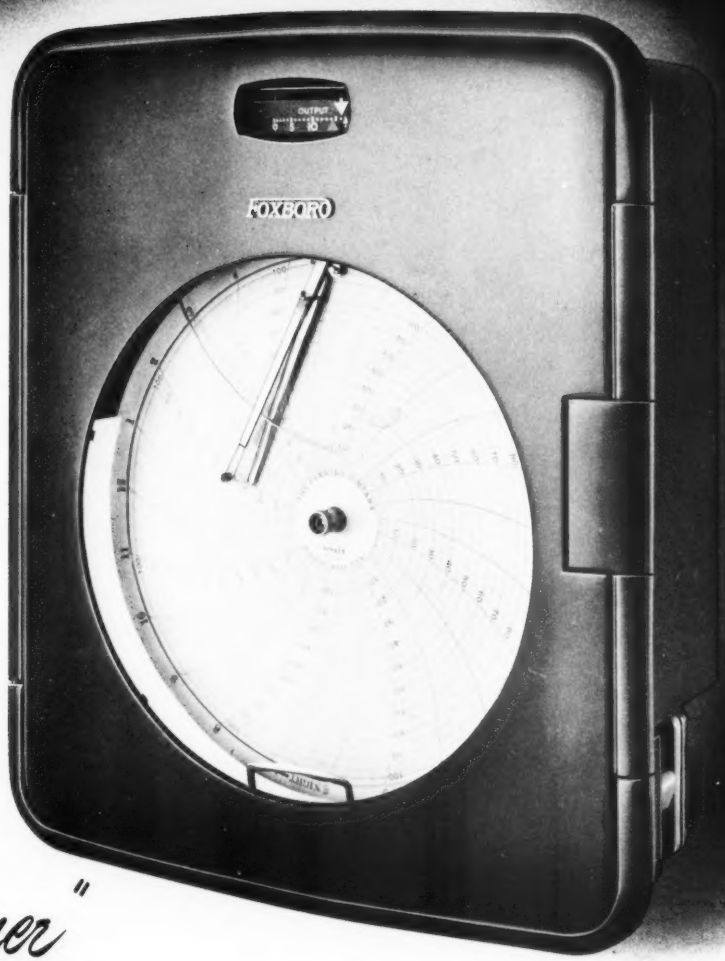


Fig. 7—Accumulator level and reflux oil—column 4



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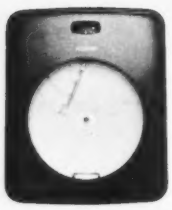
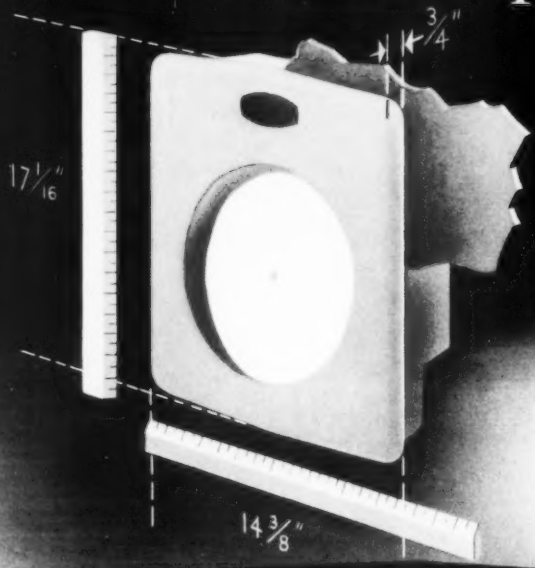
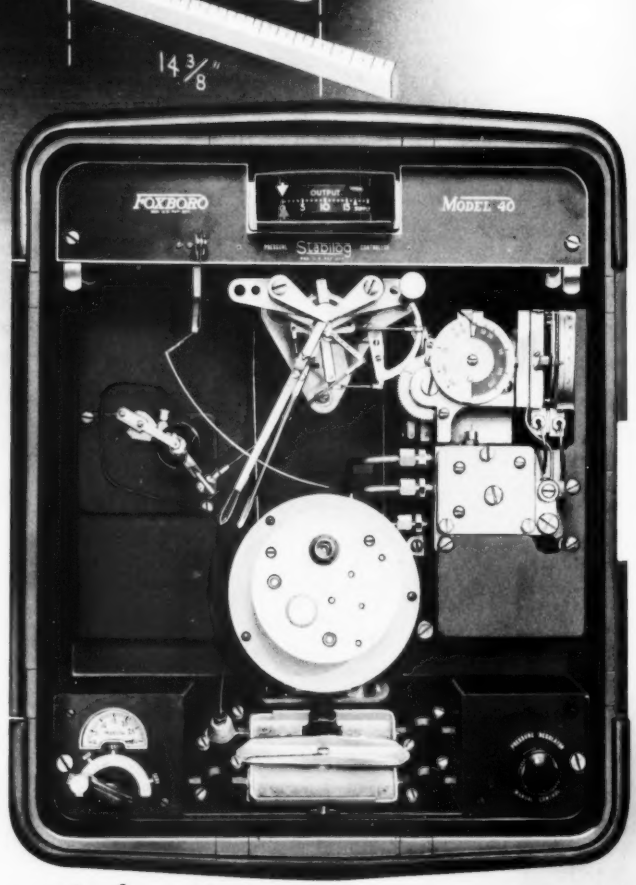


The Model 40 Pneumatic Controller is available for temperature, pressure, flow, liquid level, humidity, density, etc., in full range of control actions and combinations. Write for Bulletin 381. **The Foxboro Company, 262 Neponset Avenue, Foxboro, Mass., U. S. A.**





Unlike any other controller of this type, the M-40 is so compactly designed that the detachable manual control unit is contained entirely within the case. The M-40 occupies less space than any other controller . . . saving one-third or more panel area. What's more, the case extends outward from the board less than any other controller and is entirely free from protrusions. The latch is flush; the hinges, invisible. Despite its smaller size, the M-40 case easily accommodates four complete units such as two measuring elements and two controllers.

This outstanding compactness is one more feature that makes M-40 the finest modern controller.

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M-40

"THE FINEST MODERN CONTROLLER"

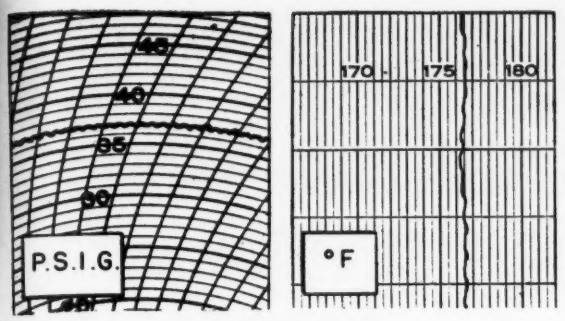

Fig. 8—Naphtha-extraction unit—Effect of variation in pressure on control-tray temperature

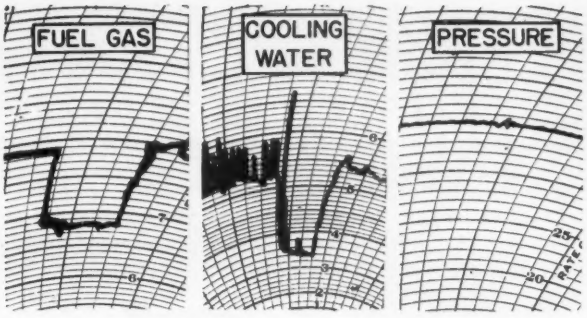

Fig. 9—Effect of fuel gas on pressure

TABLE 1—BOILING RANGE OF ESSO OCTANE (A.S.T.M. DISTILLATION POINTS)

	August 26, 1948					August 27, 1946				
Time	6A	10A	2P	6P	10P	2A	6A	10A	2P	10P
I.b.p., °F.	221	221	222	222	221	222	222	222	222	222
10 per cent	223	224	223	223	223	223	224	223	223	223
50 per cent	225	225	225	225	225	225	226	225	225	225
90 per cent	230	230	230	228	229	230	230	229	229	229
Dry point	235	235	234	234	234	235	236	234	234	234

the run and, as indicated in Table 1, variations in boiling range on the individual streams were well within the accuracy of the test method. Actually, this type of control works smoothly enough that the unit may run for 3 or 4 days without being touched by the operators.

The above is one comparison of the two control methods. Each is capable of excellent control, but when it comes to making a choice between the two, I would say, "It all depends." It depends upon the type of feed stock you are processing, the type of product you are trying to make, the accuracy of the temperature controller, and above all the degree of precision afforded by the pressure controller. After all, the fanciest temperature controller in the business is no better than the associated pressure controller. In the 150°-200° F. range, 1 lb. in pressure is equivalent to approximately 2.0° F., and there would be little wisdom in undertaking to control temperature to ⅛°-¼° F. if it were not possible to control pressure to the well known "gnat's eyelash."

Fig. 8 presents magnified sections of the pressure and control tray temperature charts from the lead column in the cyclohexane operation. It illustrates the manner in which the slightest variation in tower pressure will upset a precise temperature-control system. In this particular case, the difficulty was attributed to a sticking motor valve in the condenser water line which, in turn, caused the pressure control to overshoot.

Maintenance of Instruments

Another item which plays a big role, first in the selection of a control system and finally in the operation of a control system, is maintenance. The moment we install an instrument that cannot be properly serviced by the "graveyard" shift instrument man we are doomed to disappointment, for it goes without saying "an instrument is no better than the instrument man who services it." Likewise, when we expect a set of instruments to operate day in and day out on a diet of red ink, garnished with an occasional dry-cell battery or a shot of mercury, we are doomed to disappointment, for it takes a lot of maintenance to keep even an average four-tower control system in tip-top operating condition.

Although my background does not permit me to discuss the subject of instrument maintenance, I would like to state that I consider the daily chores such as checking zero points, wiping slide wires, and changing strip charts to be a very minor part of instrument maintenance. These tasks must be done, but certainly a first-class instrument man should not put in 8 hours a day on this type of work.

If we are to get the most out of our instruments it is imperative that our instrument men have enough unassigned time to permit them to make detailed studies of process variables and thereby keep their instrument "in tune" with the process. As an example of the benefits to be reaped from keeping instruments in tune, there are presented some charts that were obtained in the course of comparing the reaction time and accuracy of a bulb-type temperature controller with a resistance thermometer-type temperature controller.

These tests were conducted on one of the 12-ft. columns at the naphtha fractionation unit, with the temperature-measurement elements installed in the vapor space above the fortieth

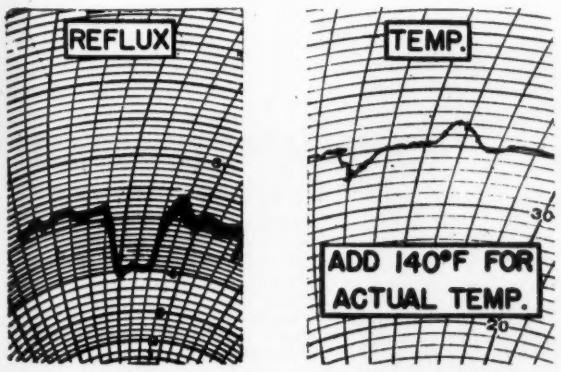

Fig. 10—Effect of fuel gas on control-tray temperature (Test No. 1)

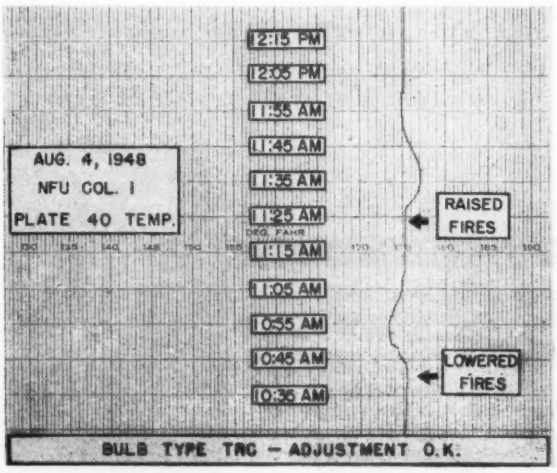

Fig. 11—Tray-40 temperature (Test No. 1)

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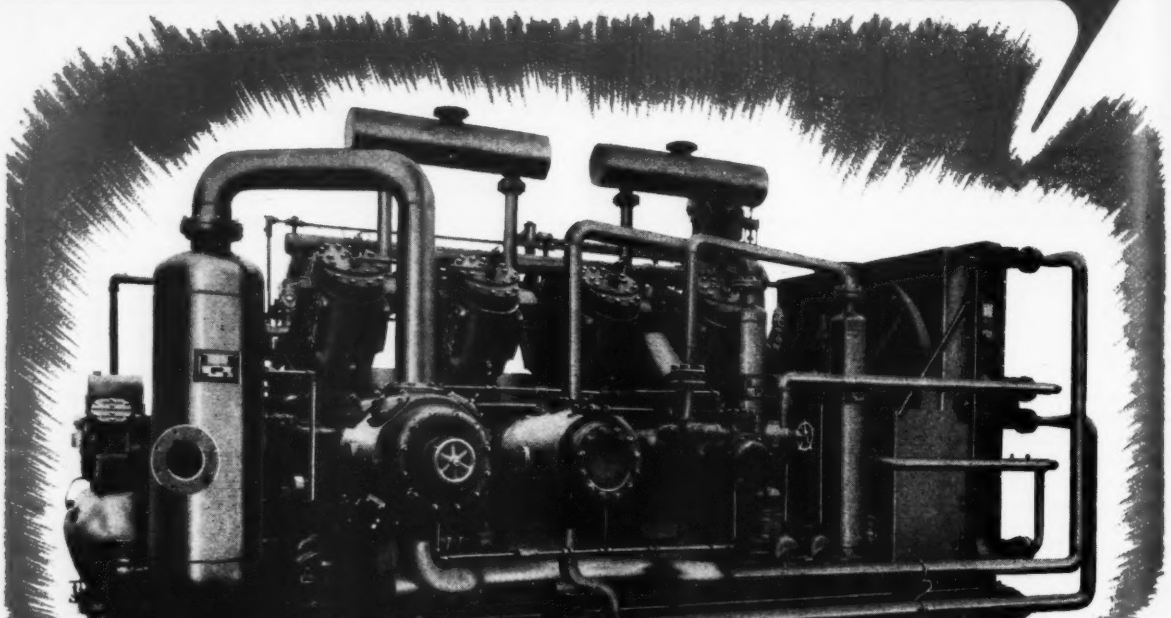

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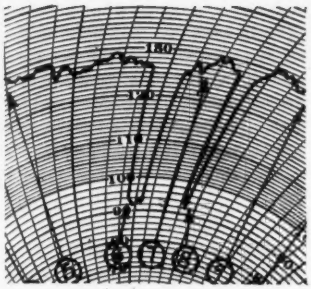


VAPOR RATE—GPH

⑤ 77,800
⑥ 79,000 (SPILLED)
⑦ 77,000
⑧ 78,400 (SPILLED)
⑨ 77,000

Fig. 12—Spilling-indicator temperature (Test No. 2)

tray of the 50-plate tower. At the start of the test the fuel-gas rate was suddenly reduced 12 per cent (in a matter of a few seconds) and the unit was allowed to line out at the new firing rate. The fuel-gas rate was then increased to the original point and the unit allowed to line out again. During this period the bulb-type temperature controller was setting the rate-of-flow controller on the reflux stream to maintain the prescribed fortieth tray temperature, while the pneumatic transmission-type pressure controller was actuating the motor valve on the water out of the reflux condensers.

Fig. 9 presents sections of the fuel gas, cooling water, and tower pressure charts for the above period. Here we have an example of one type of faulty control that periodic unhastened observation of the instrument panel can minimize or eliminate. The left-hand section of the water and pressure charts show that variations in water rate were causing fluctuation in pressure or vice versa. This is the same sticking water valve that was discussed in connection with Fig. 8, but the dates on the charts were August 4 and September 20. In the interim period the tower had been upset several times, and on one occasion this oscillation was allowed to persist for something like 48 hours. Instrument men should have time to look into things like this and, once aware of the problem, should take the initiative in effecting corrective measures.

Continuing with the test, it will be noted that although there was a slight pressure surge at the time the firing rate was reduced, pressure control was very satisfactory with the motor valve in a new position. Fig. 10 presents the reflux and control tray temperature charts for the same period. It will be observed that the bulb-type controller did a very nice job in bringing the unit back on control point in a matter of 30-40 minutes. Fig. 11 reproduces the strip chart from the resistance thermometer controller which served as a recorder during the initial phase of the test. Note that there was very little overshooting of the control point. This gives rise to the supposition that the bulb-type controller could have been adjusted to give an even speedier recovery.

The test was then repeated with the resistance thermometer-type instrument on control and the bulb-type serving as a recorder. Fig. 12 presents the reflux and control tray temperature charts for the period. Considerable difficulty was encountered in returning to the control point. This can be seen a little better in Fig. 13, which is the strip chart for the resistance thermometer instrument. Here it will be noted that after the temperature had recovered to within 1.0° F. at the control point, the instrument made no further effort to correct the temperature, and the tower started to line out with the control tray temperature 1.0° F. low. After the set pen on the rate-of-flow controller on the reflux had been lowered enough to bring the tower back on control point, the fuel gas was increased to the original setting. Again the temperature came back to within 1.0° F. of the control point, and the tower lined out with the temperature controller making no further effort toward reducing the control tray temperature. Here is a good example of an instrument capable of excellent temperature control, as evidenced by the performance of a similar instrument in the cyclohexane operation

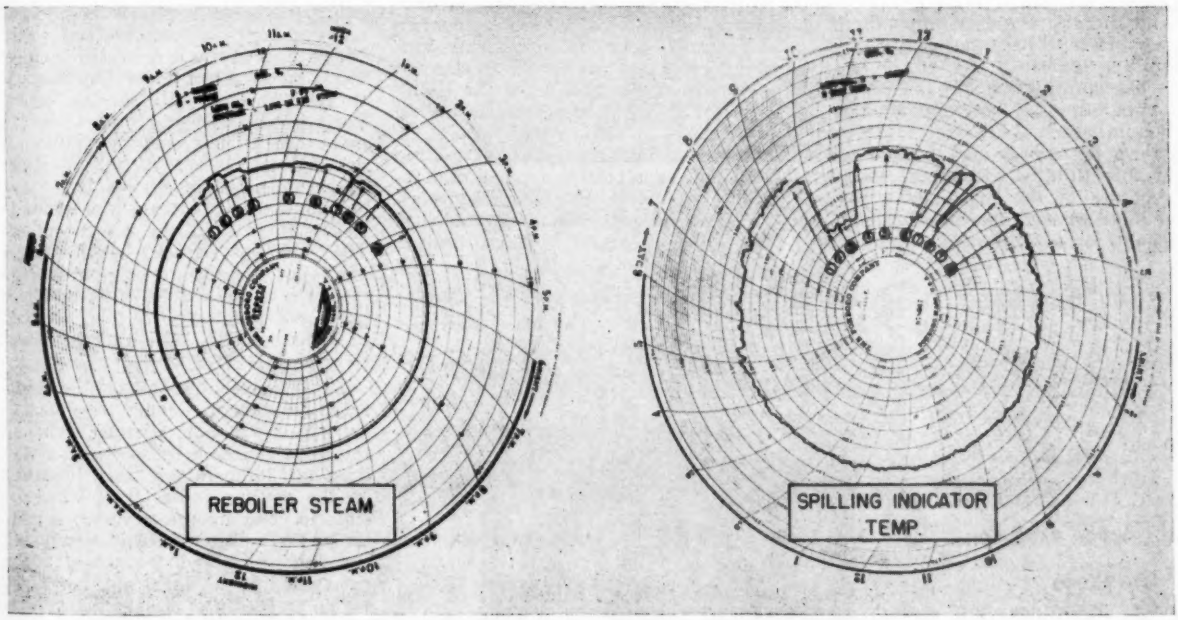


Fig. 13—Performance of spilling indicator. 1. Normal operation at 77,000-g.p.h. vapor rate. 2. Increased steam to raise vapor rate to 80,500 g.p.h. "Spilling indicator" temperature dropped 30° F. indicating presence of liquid on tray No. 2. 3. Steam reduced to decrease vapor rate to 79,000 g.p.h. Spilling continued as indicated by 94° F. temperature on spilling indicator. 4. Vapor rate reduced to 76,500 g.p.h. Tower cleared up at 11:20 a.m. as indicated by sharp rise in temperature on the spilling indicator. 5. Vapor rate increased to 77,800 g.p.h. Tower operation satisfactory. 6. Vapor rate increased to 79,000 g.p.h. Tower spilled. 7. Vapor rate decreased to 77,000 g.p.h. Tower cleared up. 8. Vapor rate increased to 78,400 g.p.h. Tower spilled. 9. Vapor rate decreased to 77,000 g.p.h. Tower cleared up. 10. Normal operation resumed 77,000 g.p.h. vapor rate

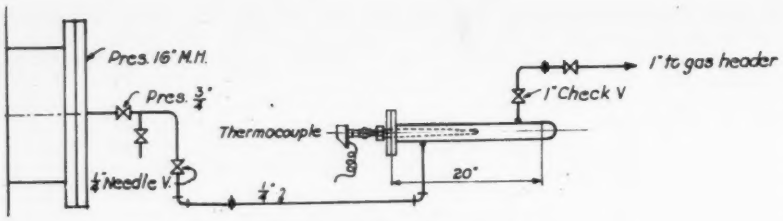


Fig. 14—Typical installation of spilling indicator

(Fig. 3), giving a poor performance as a result of being out of adjustment.

Specialized Types of Controllers

At this time I would like to stray a little from the recognized fields of endeavor and describe a specialized type of controller which was developed at Baytown in 1944. This device, which we term a "spilling indicator," is typical of specialized controllers in that it answered a particular need in a particular field. In the course of wartime operation of precise fractionation equipment, particularly that associated with alkylation and isomerization operations, considerable emphasis was placed on realizing the maximum capacity of a given fractionating tower. However, for routine operation of a tower close to the maximum loading point, it is necessary to exercise very careful control of the process variable which may undergo a small change and cause the tower to flood. In general, if tower overloading is detected at an early stage, minor adjustments can be made to reduce the overflow and vapor rates and thereby avoid an impending upset. Herein lies the utility of the spilling indicator.

The spilling indicator measures the temperature of an expanded fluid stream which is removed midway between the plates of a bubble tower. If this fluid is all vapor, the temperature of the expanded stream is reduced in accordance with the Joule-Thompson coefficient of the material. On the other hand, if the fluid contains an appreciable amount of liquid, the temperature of the expanded stream is reduced to a much greater extent by auto-refrigeration as the liquid vaporizes.

In actual operation, as depicted in Fig. 14, a small amount of fluid is withdrawn continuously from the tower and throttled into a low-pressure receiver; the temperature of the expanded stream is recorded continuously. When the liquid level on the tray reaches the sample connection, liquid flows through the throttle valve and materially decreases the recorded temperature, thus warning the operator that the tower has started to spill.

The application of this above principle to any fractionating column requires only that the pressure drop across the throttle valve be enough to cause a discernible change in temperature when liquid starts to flow through the throttle valve. For example, on the butane-splitter installation, the drop from a tower pressure of 110 psig. to fuel-line pressure of 45 psig. results in a 40° F. reduction in downstream temperature when the tower starts to spill. The midpoint between two trays is selected as being representative of the liquid level on the tray at incipient spilling conditions.

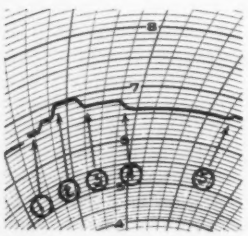
In the fall of 1944 our first spilling indicator was installed on a butane-splitter column. Previous test work on this column had demonstrated that the allowable vapor rate was limited by pressure drop through the reboiler circuit. The spilling indicator was connected to the manhead above the second tray and the vapor stream routed to the fuel system. This installation afforded a 60-65-lb. pressure drop across the throttle valve, which represented a 35°-40° F. differential in downstream temperature for vapor and liquid passing through the throttle valve.

The reboiler live steam and spilling indicator temperature charts for October 4, 1944, will be discussed in some detail since they illustrate the utility of this device in establishing the vapor-carrying capacity of a fractionation column and in lining out a column for steady operation at essentially capacity vapor rate. On this particular day we set about assuring ourselves that the tower was operating at capacity vapor rate.

As indicated in Fig. 15 the reboiler steam rate was increased a sufficient amount to give a vapor rate of 80,500 gal. per hour, and the tower spilled. The steam rate was held at this rate for some 15 minutes to insure that the spilling condition was due to overloading rather than to a temporary surge. The steam rate was then reduced to give a vapor rate of 79,000 gal. per hour but this was still above the capacity of the tower and spilling continued. It was then decided to reduce the vapor rate to 76,500 gal. per hour (the starting point) in order to let the tower clear up. After the tower had cleared up, the vapor rate was increased to 77,800, at which point operations were satisfactory.

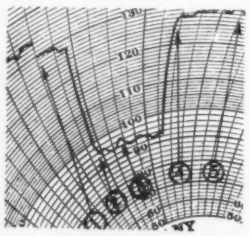
Fig. 16 presents the corresponding spilling indicator temperature which shows how sharp a break in temperature is obtained when liquid starts to flow through the throttle valve. Further test work directed toward a more careful approach to spilling is detailed in Fig. 17. With the tower operating satisfactorily at 77,800 gal. per hour, the vapor rate was raised to 79,000 g.p.m. and the tower spilled. The rate was reduced to 77,000 gal. per hour and the tower cleared. The rate was increased to 78,400 gal. per hour and the tower spilled, reduced to 77,000 gal. per hour and the tower cleared up.

Fig. 12 presented the spilling indicator temperature chart for this period. You will note that by reducing the reboiler steam rate as soon as the drop in temperature was observed on the spilling indicator it was possible to clear up the tower in a matter of 10-15 minutes. This terminated the test work and the tower vapor rate was left at 77,000 gal. per hour, which represents a satisfactory approach to a spilling rate of approximately 78,000 gal. per hour. Fig. 13 summarizes the test work described above and gives evidence to the fact that lined-out operation can be obtained at near capacity vapor rates. The patent on the spilling indicator will issue in the near future.



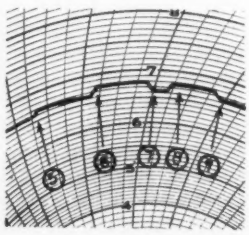
VAPOR RATE GPH

① 77,000
② 80,500 (SPILLED)
③ 79,000
④ 76,500 (CLEARED UP)
⑤ 77,800



VAPOR RATE - GPH

① 77,000
② 80,500 (SPILLED)
③ 79,000
④ 76,500 (CLEARED UP)
⑤ 77,800



VAPOR RATE GPH

⑤ 77,800
⑥ 79,000 (SPILLED)
⑦ 77,000
⑧ 78,400 (SPILLED)
⑨ 77,000

Fig. 15—(Left) Reboiler steam (Test No. 1). Fig. 16—(Center) Spilling indicator temperature (Test No. 1). Fig. 17—(Right) Reboiler steam (Test No. 2)

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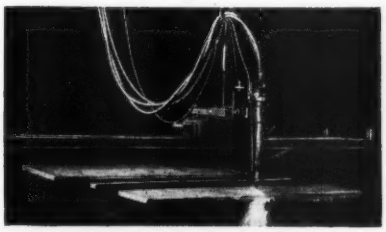

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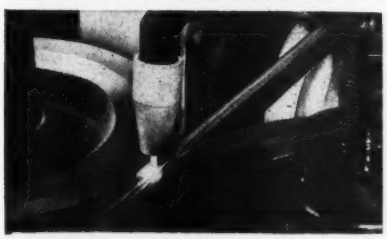

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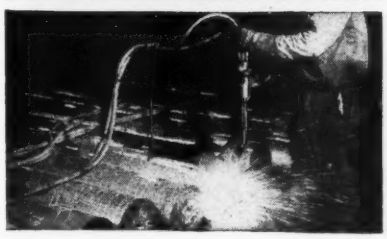

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Sources of Error in Subsurface-Pressure-Gage Calibration and Usage

by R. V. Smith* and E. J. Dewees†

ERRORS in subsurface-pressure-gage calibration include both inherent and avoidable types. The inability to reproduce gage readings with identical pressures, for example, and the effect of time and usage on gage characteristics both introduce permanent errors in subsurface-pressure-gage determinations that are inherent in the gage itself. Every gage probably has inherent errors of individual magnitude, and in this respect they differ from other types of pressure gages. Inherent errors in subsurface-pressure-gage determinations cannot be eliminated, but their magnitude can be evaluated by repeated calibrations. Avoidable errors are introduced by interpretating chart readings incorrectly, by neglecting to take into account factors that influence gage readings, and by failing to duplicate field conditions while the gages are being calibrated. Avoidable errors can be eliminated only by the exercise of care and experience gained through a study of gage characteristics.

The successful solution of many engineering problems that require a knowledge of pressures in oil and gas-condensate reservoirs depends upon the accuracy of measurements made with subsurface-pressure gages. An accurate knowledge of the change of pressure in a reservoir with time or conditions of operation requires a precision in subsurface-pressure gages not usually necessary for routine surveys. The results reported in this paper were obtained in an attempt to calibrate an Amerada-type subsurface-pressure gage with a range of 1,200 psi. to a degree of accuracy deemed necessary for determining the pressure loss due to friction in untubed flowing gas wells.

The results obtained by extensive calibrations are described in the following discussion in which the reported corrections for errors are believed to apply only to the particular gage, as no two gages are exactly alike. However, the sources of error are the same for all gages of the same type. All data reported are taken from calibrations in which each calibration pressure was reached by gradually increasing the pressure applied to the gage. While hysteresis effects—the lag in deflection noted when decreasing pressures are recorded—in subsurface-pressure gages are important in gage usage, a complete study of hysteresis is beyond the scope of this report.

The sources of error in the calibration and usage of subsurface-pressure gages reported herein are those found in experiments with an instrument of 1,200-psi. range having a helical-tube pressure element. Brownscombe and Colon[1] investigated this type of instrument and reported three types of errors: (1) those due to inaccuracies in reading the pressure charts, (2) those due to irreproducibility of the pressure element and recording system, and (3) those caused by failure to allow the gage to reach temperature equilibrium. They suggested the use of a "zero pressure line" instead of the chart "base line" from which all deflections should be measured. In a later paper Brownscombe[2] suggested the use of a field calibration technique for precision work with subsurface gages.

The use of the method of least squares and a study of the resulting gage modulus and zero-pressure correction have enabled the writers to isolate at least five additional sources of error which are equally important in gage usage as those pointed out by previous investigators and should be considered for a complete understanding of subsurface gages.

The sources of error reported in

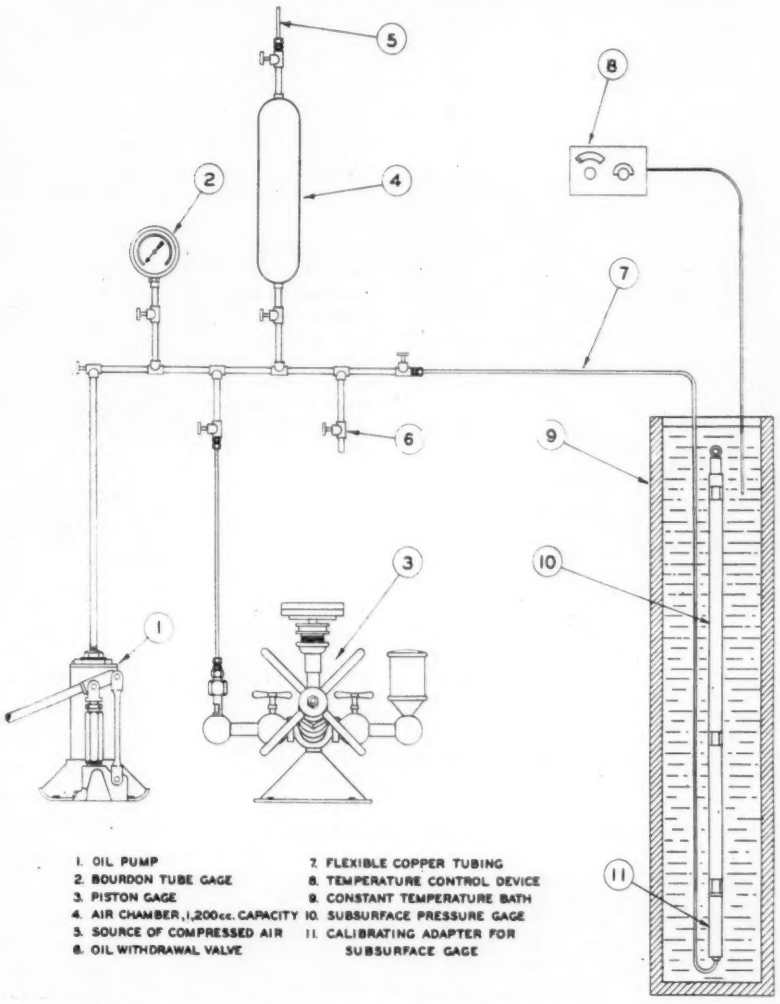

1. OIL PUMP
2. BOURDON TUBE GAGE
3. PISTON GAGE
4. AIR CHAMBER, 1,200cc. CAPACITY
5. SOURCE OF COMPRESSED AIR
6. OIL WITHDRAWAL VALVE
7. FLEXIBLE COPPER TUBING
8. TEMPERATURE CONTROL DEVICE
9. CONSTANT TEMPERATURE BATH
10. SUBSURFACE PRESSURE GAGE
11. CALIBRATING ADAPTER FOR SUBSURFACE GAGE

Fig. 1—Schematic sketch of assembly for calibrating subsurface pressure gages

*Physical chemist, †petroleum engineer, Petroleum Experiment Station, Bureau of Mines, Bartlesville, Okla.

this paper may be classified as follows:

1. Inherent errors resulting from: (a) Inability to reproduce pressure-gage measurements. (b) Changes in gage characteristics with time.

2. Avoidable errors resulting from: (a) Use of charts and stylus points not suitable for precision measurements. (b) Pressure shocks transmitted to gage from pump to calibration. (c) Failure to reach temperature equilibrium within the gage. (d) Failure to reach mechanical equilibrium within the gage. (e) Neglecting to consider the effect of barometric pressure or air pressure on the outside of the pressure element. (f) Change of zero-pressure correction with temperature.

Experimental Procedure and Results

Description of instrument. — The pressure element of the Amerada-type subsurface-pressure gage is a helical tube with the upper end closed and free to move. Applied pressures are transmitted through a sylphon bellows arrangement to the lower end of the helical tube, which is fixed to the gage frame. An increase of pressure causes an uncoiling motion of the tube, which is transmitted to a stylus point by a vertical shaft. Stearns[2] has published a detailed description of the instrument, including a sketch showing its main features of construction.

Calibration of instrument. — The gage was calibrated by applying measured pressures through use of a piston gage at several calibration temperatures and measuring the resulting deflections of the stylus from a zero-pressure line. The zero-pressure line or base line from which all deflections are measured was marked on the chart under carefully controlled conditions. The essential features of the equipment used to calibrate subsurface-pressure gages are illustrated schematically in Fig. 1. The first step in the calibration of the pressure gage was to disconnect line **7** from the manifold and replace the oil in the line and in calibrating adapter **11** with air. Having line **7** open to the atmosphere and free of oil prevented the pressure of an oil head from displacing the position of the zero-pressure line. The gage in the constant-temperature bath was allowed to come to temperature equilibrium at a predetermined zero-pressure-line temperature. After reaching temperature equilibrium, the gage was partly removed from the bath, the zero-pressure line was quickly marked on the chart, and the top sleeve was placed on the gage. The instrument was thus sealed from the atmosphere, the temperature of the air in the recording mechanism and around the outside of the pressure element being the same as the temperature at which the zero-pressure line was marked. The air in the connecting line and calibrating adapter was replaced with oil, and the gage again was submerged in the bath; the temperature of the bath was brought to a calibration temperature, and the gage was allowed to come to temperature equilibrium. Increasing pressures then was applied successively to the gage by means of pump **1** and calibrated piston gage **3.** Pressure shocks from the pump were cushioned by air chamber **4** of 1,200-cc. capacity in the line between the pump and the gage. After each increment of calibration pressure was applied the gage was shaken sharply.

The pressure indicated by the piston gage were corrected for the pressure of the head of oil resulting from the difference in elevation of the piston gage and the subsurface gage. Pressures of 100 to 1,100 psi. in 200-lb. increments were applied to the gage at 60°, 80°, 100°, and 120° F. Thus, there were 6 calibration points at each of 4 temperatures, or 24 points in all. This procedure comprised a complete calibration for a given zero-pressure-line temperature.

Reading the Calibration Chart

The pressure-recording charts used in the gage are 2¼ by 5⅞ in. in size, with deflections being recorded on the shorter dimension. The deflections of each pressure intensity from the zero-pressure line were measured with a comparator microscope, which permitted the reading of reflections directly to a thousandth of an inch and estimating them to the nearest ten-thousandths of an inch. The deflection measurements were made from the edge of the zero-pressure line nearest the chart edge to the edge of each pressure-intensity line nearest the zero-pressure line. Although zero-pressure lines made with the 1,200-psi. instrument have a slight curvature (less than 0.001 in.), the

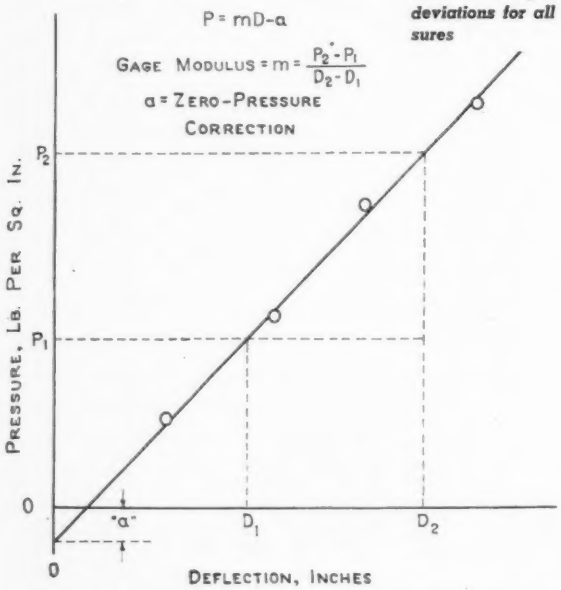
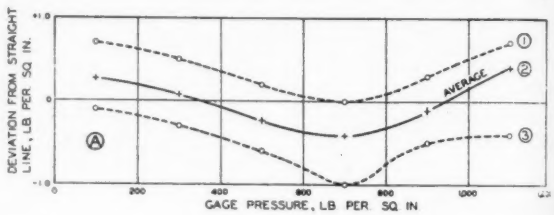
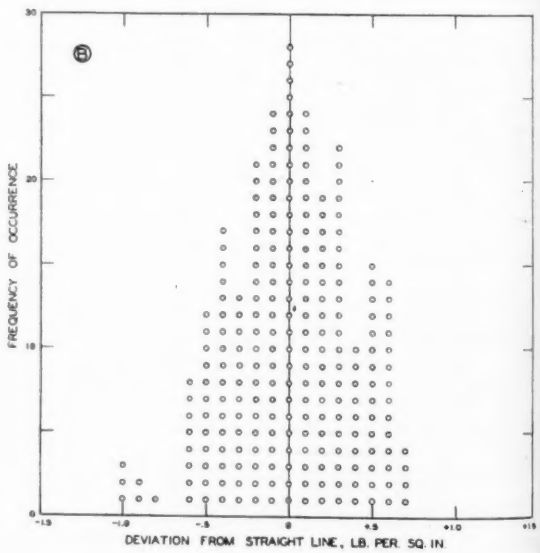


Fig. 2—Schematic calibration plot at a given temperature

Fig. 3—(Right) Deviation of 1,200-lb. subsurface-pressure-gage calibrations from straight lines. A—Spread of deviations and average at calibration pressures; B—Frequency of deviations for all pressures





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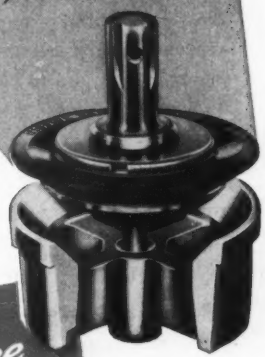

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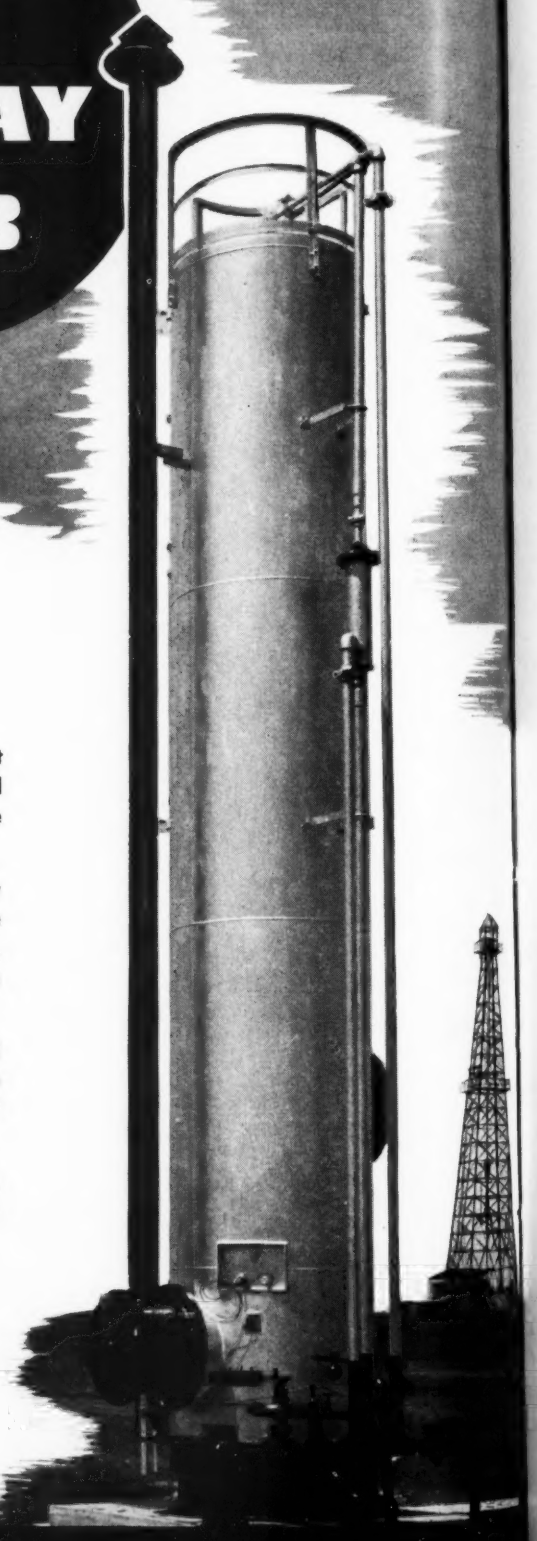

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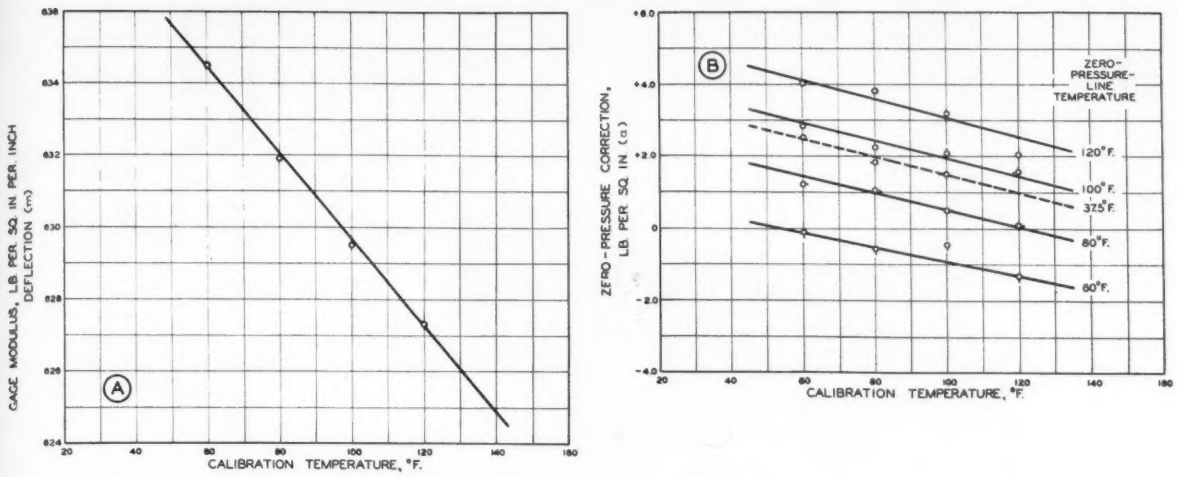

Fig. 4—Characteristics of 1,200-lb. subsurface pressure gage. A—Gage modulus; B—zero-pressure corrections

chart was aligned so that the comparator microscope indicated zero deflection at either end of the chart, where time was zero, and at the maximum time travel of the chart.

Computing Calibration Results

The method of converting gage deflections to pressures by the use of elaborate charts is limited by the accuracy of the charts and the accuracy of reading the resultant pressures. The use of equations to convert deflections to pressures mathematically has been proposed by several writers. The convenience of equations has been discussed by Perkins and Chaney,[4] who used the method of averages to compute a straight-line equation relating pressures to deflections. They used the differences between calibration pressures and pressures indicated by the straight-line equation as measures of the errors to be expected in the use of subsurface gages. The method of least squares to fit calibration data to a straight line has been suggested by Hawkins,[5] who explains the method in detail and points out the increased accuracy of equations over conventional charts for converting deflections to pressures.

Bureau of Mines engineers have used the method of least squares to compute the results of pressure-gage calibrations and have found it especially useful in identifying and evaluating errors in pressures measured by subsurface gages. Deflections and corresponding pressures at each calibration temperature were fitted by the method of least squares to the following linear equation:

$$P = mD + a \qquad (1)$$

where

P = pressure, psig.
m = gage modulus, psi. pressure, corresponding to 1-in. deflection
D = deflection, inches (deflection of the stylus from the zero-pressure line caused by pressure)
a = zero-pressure correction, psi.

An example of the computations required to fit calibration data at 80° F. to Equation 1 is shown in Table 1. The columns of figures under the headings "pressure × deflection" and "deflection squared" are required computations for solution of the least-squares equations given in the lower part of Table 1. (It should be noted that the equations call for the sums of the respective quantities.) From the results of the computations shown in Table 1 gage modulus m, was found to be 631.77 and zero-pressure correction a, —0.56, both at 80° F. For these conditions Equation 1 becomes:

$$P \times 631.77D - 0.56 \qquad (2)$$

Pressures listed under P_c or computed pressures were obtained by substituting the deflections in Equation 2 and solving for pressure P. The physical significance of gage modulus m, and zero-pressure correction a, are shown on Fig. 2, where pressure is plotted as a function of deflection on exaggerated scales. The modulus is the slope of the line and the zero-pressure correction is the intercept of the line on the pressure ordinate where the deflection is zero.

A total of 237 calibration points was examined for the 1,200-psi. instrument. The pressure points at a calibration temperature for each individual run were fitted to a straight line by the method of least squares. Deviations were computed for each point by subtracting the computed pressure from the calibration pressure as shown in the last column of Table 1. The sum of all the deviations, without regard to positive or negative values, between the pressure applied to the gage and pressure indicated by the least-squares line was 69.2, and thus the arithmetic average was 0.29 psi. (69.2/237 = 0.29). The largest deviation observed was —1.0 psi. The deviation followed a slight downward and then an upward trend when plotted against increasing pressure. Curve 2 of Fig. 3, **A**, shows the magnitude of the average deviation from a straight line at each

TABLE 1—EXAMPLE OF METHOD OF LEAST SQUARES FOR FITTING DEFLECTIONS AND PRESSURES TO A LINEAR EQUATION, ZERO-PRESSURE LINE PLACED ON CHART AT 60° F.

Calibration temp. (°F.)	P Calibration pressure, psi.	D Deflection, in.	PD pressure × deflection	D^2 Deflection squared	P_c Computed pressure, psi.	$P - P_c$ = Deviation, psi.
80	101.8	0.1616	16.451	0.026115	101.5	+0.3
80	301.4	0.4778	144.009	0.228293	301.3	+0.1
80	501.1	0.7945	398.124	0.631230	501.4	—0.3
80	700.8	1.1108	778.449	1.233877	701.2	—0.4
80	900.4	1.4263	1,284.241	2.034332	900.5	—0.1
80	1,100.1	1.7415	1,915.824	3.032822	1,099.7	+0.4
Sum	3,605.6	5.7125	4,537.098	7.186669	Average = 0.27	

$$m = \frac{\Sigma(P)\,\Sigma(D) - n\Sigma(PD)}{(\Sigma D)^2 - n\Sigma(D^2)} = \frac{3{,}605.6 \times 5.7125 - 6 \times 4{,}537.098}{(5.7125)^2 - 6 \times 7.186669} = \frac{-6{,}625.598}{-10.487358} = +631.77$$

$$a = \frac{\Sigma(D)\,\Sigma(PD) - \Sigma(D^2)\,\Sigma(P)}{(\Sigma D)^2 - n\Sigma(D^2)} = \frac{5.7125 \times 4{,}537.098 - 7.186669 \times 3{,}605.6}{-10.487358} = \frac{+5.918}{-10.487358} = -0.56$$

Σ = Sum

n = number of determinations

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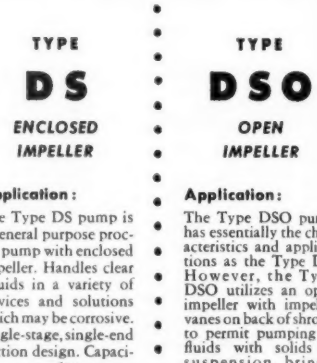

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calibration pressure. Limits of the spread of the observed data are shown by dashed curves 1 and 3. No positive deviations were observed at a calibration pressure of 700 psi., whereas most of the deviations were positive at calibration pressures of 100, 300, and 1,100 psi., indicating that pressure is not absolutely a straight-line function of deflection for the particular gage used. However, the variation from a straight line was not large enough to destroy the usefulness of the method of least squares for evaluating subsurface-pressure-gage characteristics.

The deviations taken as a group are almost evenly divided between positive and negative values, as is evident in Fig. 3, **B**, where they are plotted against frequency of occurrence. It is interesting to note that 64 per cent of the deviations are within the ±0.3-psi. range and that 86 per cent fall within ±0.5-psi. limits.

Gage Modulus

The gage modulus or pressure in pounds per square inch corresponding to 1-in. deflection at different calibration temperatures was found to decrease as the calibration temperature increased. A complete record of the determinations of the gage modulus at the various calibration temperatures is given in Table 2. A maximum variation in the modulus of 0.4 per cent was observed over a period of 7 months, during which time 12 calibrations were made and the gage was used extensively in the field. No progressive trends in the modulus were evident, and the range of 0.4 per cent in modulus values may indicate a change of gage characteristics over the period of observation whereas the spread of the devations about a straight line are a measure of gage reproducibility. The spread of deviations of ±0.3 psi. containing 64 per cent of the calibration points, as previously stated, is 0.05 per cent (0.6 × 100/1,200 = 0.05) of the maximum pressure range of the gage.

TABLE 2—GAGE MODULUS DETERMINATIONS FOR A 1,200-LB. RANGE SUBSURFACE-PRESSURE GAGE

Calibration date	Modulus, psi. corresponding to 1 in. deflection, at calibration temperature, °F.			
	60	80	100	120
11-24-47	634.9	633.1	629.3	626.9
(Gage was used extensively at this interval)				
1-2-48	633.1	630.3	628.3	625.9
5-17-48	634.7	631.3	629.1	627.1
5-20-48	634.8	631.8	628.9	627.1
5-25-48	635.0	632.8	630.6	628.4
5-27-48	635.0	632.1	629.6	627.1
6-1-48	634.6	631.8	629.7	627.6
6-3-48	634.6	632.1	629.8	627.3
6-7-48	634.7	632.1	629.8	627.5
6-11-48	634.5	632.2	629.7	627.1
6-15-48	634.5	631.8	629.7	627.7
6-17-48	633.7	631.3	629.3	627.3
Average ..	634.5	631.9	629.5	627.3

The arithmetic average values of the modulus, including all calibrations, are shown in Fig. 4, **A**, where a straight line has been drawn through the points. By similar plotting of the modulus values from all calibrations, the experimental points formed straight lines. Variations of the points from the lines are probably within the experimental accuracy of the method. Plots of the modulus against temperature provide a convenient means of interpolating between calibration temperatures and showing the condition of the gage from time to time.

Zero-Pressure Correction

Zero-pressure corrections for calibrations having different zero-pressure-line temperatures were plotted as a function of the calibration temperature in Fig. 4, **B**, and straight lines drawn through the experimental points. The configuration of the points shows that the lines should have approximately identical slopes, indicating that the data form consistent relationships with calibration temperature. The vertical displacement of the lines indicated that the temperature of the gage at the time the zero-pressure line was placed on the chart materially influenced the zero-pressure correction. Two distinct relationships are indicated: (1) change of the zero-pressure correction with calibration temperature, and (2) change of position with zero-pressure-line temperature.

As shown in Fig. 4, **B**, the value of the zero-pressure correction decreases as the calibration temperature increases. The average slope of the lines (Fig. 4, **B**), is —0.5 psi. for an increase in calibration temperature of 20° F. Although the gage was sealed during calibration, internal air pressure increased with increased calibration temperature, whereas increase in internal pressure would have the opposite effect. Consequently, the zero-pressure corrections show that the effect of temperature on the gage is greater than the effect of internal pressure on the pressure element.

A sleeve with a pressure connection was constructed for the gage to permit the application of controlled air pressure or partial vacuum outside the pressure element. The results of several experiments showed that an increase of 1.0 psi. in internal pressure decreased the deflection at any pressure by an amount equivalent to 1.0 psi.

The change of the zero-pressure correction with zero-pressure-line temperature (Fig. 4, **B**) is a result of the excess movement caused by thermal expansion of the pressure element over the effect of the increase in internal pressure. The average of four determinations of the change of zero-pressure-line position with temperature, while the internal pressure was held constant, indicated that an increase of 100° F. changed the position of the zero-pressure line in a positive direction by 0.006 in. This movement is equivalent to the movement caused by a pressure of 3.8 psi., a value that correlates well with the zero-pressure corrections shown in Fig. 4, **B**. The consistent relationship between zero-pressure-line position and temperature did not hold at temperatures below 60° F., where unexpected results were obtained, as shown by the dashed line for a temperature of 37.5° F. Several unsuccessful attempts were made to check the zero-pressure corrections reported for the 37.5° F. line. Values as low as those reported for 60° F. were obtained.

Zero-pressure corrections for zero-pressure lines made for temperatures above 60° F. are thought to be reliable for the gage studied. All calibrations on the gage gave modulus values that agreed closely, but several zero-pressure corrections obtained were in error by as much as 1.0 psi. The position of the zero-pressure line is the rest position of the pressure element. Even minor friction effects change the rest position slightly, and the magnitude of the change depends in some way upon how the last pressure that was acting upon the gage was relieved. One difficulty with the application of the concept of zero-pressure correction to gage usage is the inability to reproduce the zero-pressure-line position. Considerable effort was made without success to overcome this difficulty, as errors of constant magnitude up to 1.5 psi. were traced to this source.

Errors and Their Magnitude

Inability to reproduce gage measurements. — The arithmetic average deviation of 237 calibration points from a straight line was found to be 0.29 psi.; 64 per cent of the deviations were within ±0.3 psi. of a straight line. In the field the gage reproduced subsurface pressures, with a maximum variation of 0.7 psi., on three successive traverses in a flowing gas well (Table 3). During the tests the well-head pressure increased from 244.6 to 244.8 psia. and then decreased to 244.6 psia.

Change of gage characteristics with time.—The gage modulus charged a maximum of 0.4 per cent during the 7-month observation period. However, no trends or consistent changes in the gage modulus were noticeable.

Charts and stylus points. — The charts used in this study were made

TABLE 3—SUBSURFACE PRESSURES IN A FLOWING GAS WELL, PANHANDLE FIELD, TEXAS, 1947

Depth, ft.	Pressure, psi. (1)	(2)	(3)
1,750	....	262.9	262.2
2,000	264.7	264.5	264.6
2,250	267.1	267.0	266.6
2,500	268.8	269.1	268.6

of polished, bright aluminum foil, and the stylus points were "Permopivot" phonograph needles* of osmium-alloy; the points had a radius of curvature of less than 0.001 in. With Permopivot points and bright aluminum foil (full-hard temper) the average deviation from a straight line was 0.29 psi., whereas when gold stylus points and white charts (white-coated brass foil) were used the average deviation of 98 calibration points from a straight line was 0.8 psi. Thus, by improving the stylus and chart materials the average deviation was decreased by more than 60 per cent. Although lines made with the Permopivot point on aluminum were not as readily visible to the naked eye as those made with gold points on white charts, they were more easily read with a comparator microscope than the wider lines made with gold points. Narrow, sharply defined lines on charts are essential to precise pressure measurement.

*The use of aluminum charts and Permopivot stylus points was suggested in correspondence by E. R. Brownscombe of The Atlantic Refining Co., Dallas.

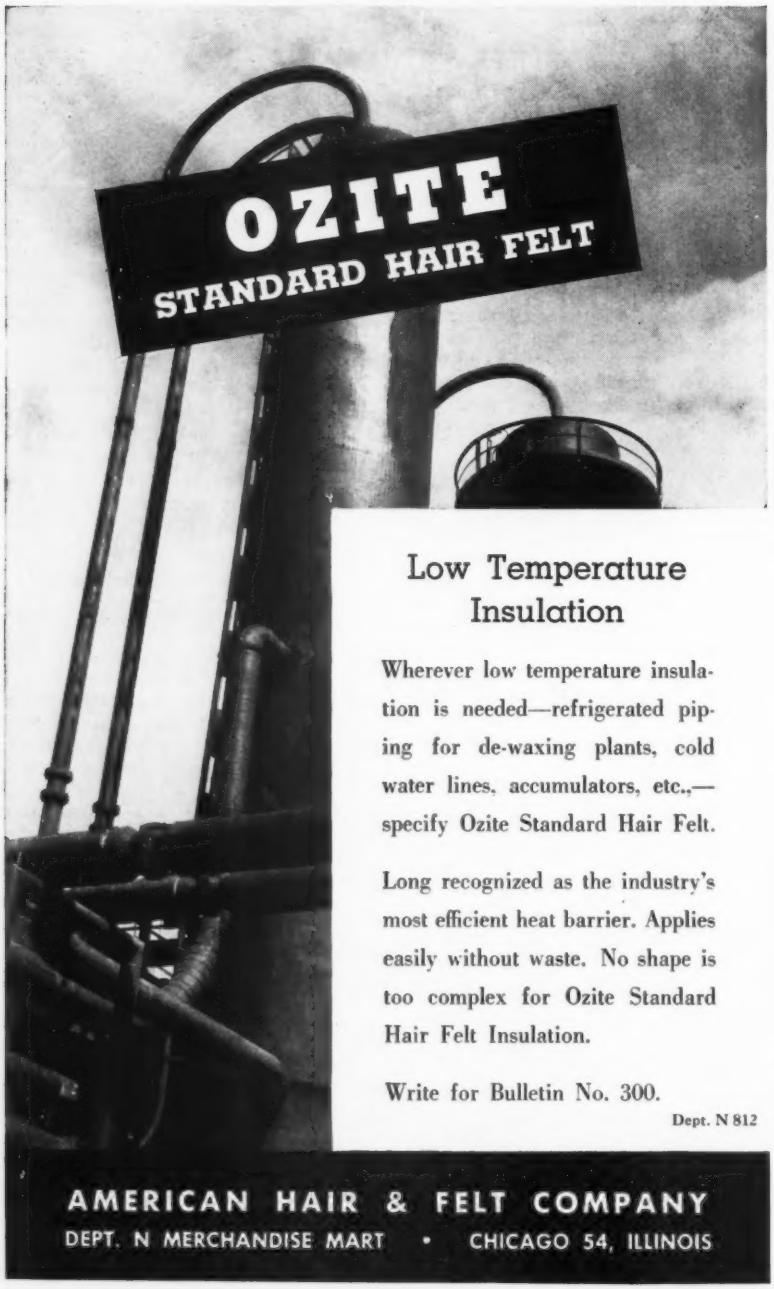
TABLE 4—COMPUTATION OF SUBSURFACE PRESSURES IN A GAS WELL USING THE SUBSURFACE PRESSURE GAGE AS A DIFFERENTIAL MEASURING INSTRUMENT, CLIFFSIDE FIELD, TEXAS

Depth, ft.	0	1,000	2,000	3,000	3,250	3,500
(1) Lubricator pressure, psi.	683.8	683.8	683.8	683.8	683.8	683.8
(2) Gage temperature, °F.	67.0	68.6	80.5	91.6	93.5	95.4
(3) Deflection, in	1.0758	1.1100	1.1415	1.1748	1.1841	1.1933
(4) Modulus, psi. per inch deflection	633.6	633.4	632.0	630.6	630.4	630.2
(5) (Modulus) × (deflection), psi.	681.6	703.1	721.4	740.8	746.5	752.0
(6) Zero-press. correction at lubricator, psi.	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2
(7) (Temp. difference) × (0.025)	....	0.0	—0.3	—0.6	—0.7	—0.7
(8) Atmospheric pressure, psi.	12.9	12.9	12.9	12.9	12.9	12.9
(9) Subsurface press., psia. (5) + (6) + (7) + (8)	.....	718.2	736.2	755.3	760.9	766.4
(10) Subsurface pressure, psia. calculated from weight of gas column	....	716.6	736.4	756.3	761.3	766.2
(11) Difference, psi.	.....	+1.6	—0.2	—1.0	—0.4	+0.2

Pressure shocks transmitted to gage from pump during calibration.—While calibrating the gage it was found necessary to insert an air chamber containing approximately 520 cc. of compressed air at 100 psi. and 55 cc. at 1,000 psig. in the pressure line between the pump and the subsurface gage to "air cushion" momentary pressure surges set up by the pump, which frequently produced pressures above the calibration pressure. Pressures above the calibration pressure would have introduced gage hysteresis and thus another avoidable error.

Failure to reach temperature equilibrium within the gage.—Gage temperatures materially influence the gage modulus and also the zero-pressure correction, as shown in Fig. 4. Although no determinations were made of the time required to attain temperature equilibrium, 1½ minutes was allowed per 1° F. change of gage temperature. No erratic calibrations resulting from failure to obtain temperature equilibrium were obtained after this precaution was taken.

Failure to reach mechanical equilibrium within the gage.—Vibration set up in the gage while being lowered in a well causes considerable movement of the stylus, as evidenced by charts taken in wells. In an effort to duplicate conditions met when lowering subsurface pressure gages in wells during the calibration procedure, the gage was shaken sharply after a calibration pressure had been applied to the gage. Calibrations made without shaking the gage differed by as much as 1.3 psi. from those made when the gage was shaken. Apparently shaking the gage helped to over-



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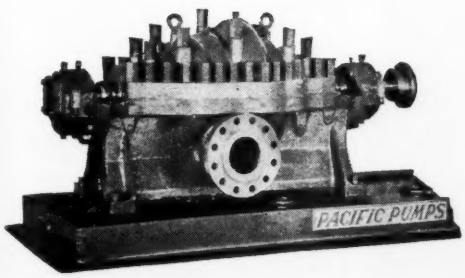

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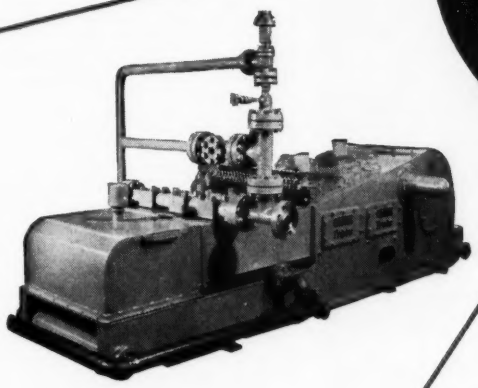

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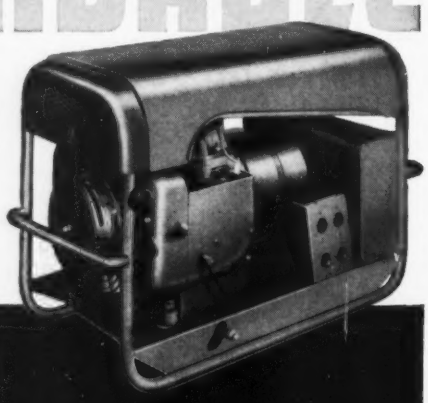

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Effect of barometric pressure and air pressure on the pressure element. Experimental results indicate that an increase in air pressure outside the pressure element but inside the gage decreases the deflections by an amount exactly equivalent to the increase in air pressure. When a gage is lowered in most oil or gas wells temperatures usually are higher than those at which the gage was sealed. As a result of warming the gage, the pressure of the air within the gage increases in some cases as much as several pounds per square inch; ordinarily, this source of error is eliminated because most laboratory calibrations are planned to duplicate use of the gage in wells. However, if this fact is not taken into account in the laboratory calibrations, the magnitude of the resultant error will be determined by the temperature of the gage in a well. When the gage is sealed before it is calibrated it should not be opened and resealed at a different temperature during calibration.

Change of Zero-Pressure Correction With Temperature

Increase in temperature changes the zero-pressure correction, (1) by decreasing the zero-pressure correction with calibration temperatures and (2) by changing its position with zero-pressure-line temperature. For all calibrations made on the instrument having a range of 1,200 lb. the average change of the correction is —0.5 psi. for an increase in calibration temperature of 20° F., or —0.025 psi. per degree Fahrenheit (Fig. 4, **B**).

The position of the "pseudo" zero-pressure line on the chart depends on the temperature of the gage at the time the zero-pressure line is marked on the chart. Two zero-pressure lines on the same chart, one at 60° F. and the other at 120° F., are separated by a distance equivalent to 2.5 psi. (By combining the change of zero-pressure correction with calibration temperature, $2.5 + 60 \times 0.025 = 4.0$, the difference between the 60° and 120° F. lines in Fig. 4, **B**, is obtained.) If the gage is calibrated at normal room temperature and is then used in the field under winter conditions, errors of 2.5 psi. or more are introduced unless the necessary corrections are made.

Recommendations

Two courses of action are available for improving the use of subsurface-pressure gages in the field: (1) The gage may be used as an independent measuring instrument to obtain direct pressure measurements, and (2) it may be used as a differential measuring instrument to obtain measurements of the difference between wellhead pressure determined with a pis-

ton gage and subsurface pressure. The writers' experimental work has shown that gage calibration on a modulus and zero-pressure-correction basis provide the most accurate results.

Three conditions must be met in order to use the gage as an independent measuring device. The modulus must be determined over the expected range of temperature, the complete zero - pressure - correction characteristics of the gage must be known, and the zero-pressure line must be placed on the chart when the gage temperature is known. Fig. 4 illustrates a convenient means of presenting modulus and zero-pressure-correction information.

The use of a subsurface-pressure gage as an independent instrument for work requiring accurate pressures presents several difficulties; for example, an elaborate series of calibrations must be made to determine the complete zero - pressure - correction characteristics of the gage before accurate results can be obtained. Because of the uncertainty of the rest position of the pressure element, zero-pressure corrections may change from time to time, depending in part on the past history of the gage. The magnitude of the error from this source will be a constant throughout the range of the gage, whereas errors in the modulus will be proportional to the measured pressure.

The data presented in this report show that two characteristics of subsurface-pressure gages are outstanding with respect to constancy and reliability—(1) the gage modulus and (2) the change of zero-pressure correction with calibration temperature (the slope of the lines in Fig. 4, **B**). For maximum accuracy it is recommended that use of these two characteristics be made the basis of pressure determinations when the Amerada-type subsurface-pressure gage is used. To do so requires the determination of a zero-pressure correction every time the gage is used in the field and although this may be done by several methods, it probably is most convenient to measure the pressure on the subsurface gage with a piston gage while the gage is in the lubricator at the well head. In that way the subsurface gage can be used to measure differential pressure between subsurface and well-head pressures.

These recommendations may be carried out by determining the zero-pressure correction of the gage at lubricator temperature from the following equation:

$$a = P_w - m_1 D_1 \qquad (3)$$

where

a = zero-pressure correction, psi. at the temperature of the subsurface gage in the lubricator

P_w = lubricator pressure, psi. meas-

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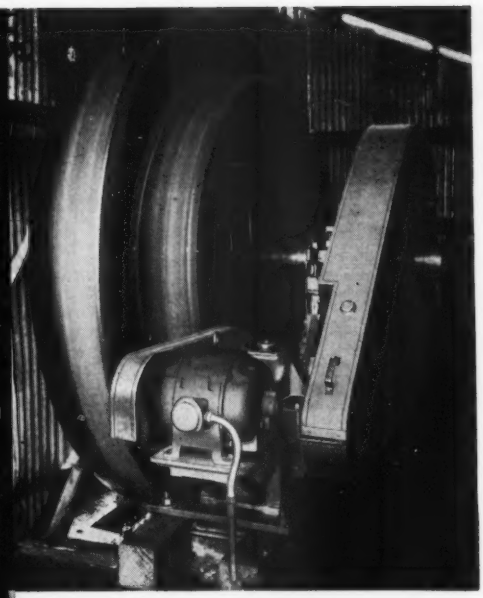

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ured with a piston gage

m_t = gage modulus, psi. per inch deflection at the temperature of the subsurface gage in the lubricator

D_t = deflection, inches, indicated by the subsurface gage at lubricator pressure

At higher temperatures the zero-pressure correction has been shown to decrease 0.025 psi. per degree Fahrenheit rise in temperature for the individual gage studied. Pressures at depths below the well-head then may be computed by means of Equation 4:

$$P_s = m_s D_s + a - 0.025 (t_s - t_t) \quad (4)$$

where

P_s = subsurface pressure, psi. at depth s in the well

m_s = gage modulus, psi. per inch deflection at the temperature of the subsurface gage at depth s in the well

D_s = deflection, inches corresponding to P_s

a = zero-pressure correction, psi. computed by Equation 3

t_s = temperature, °F. at depth s

t_t = temperature, °F. in the lubricator

The success of any method of using the subsurface gage depends upon temperature equilibrium within the gage and a knowledge of that temperature. For that reason subsurface temperature gages should be used in conjunction with pressure gages to obtain the best results.

An example of the computations required to carry out the recommendations made is given in Table 4; the gage was used in a dry-gas well in Cliffside field, Texas, which was shut in at the time the test was made. The subsurface pressures calculated for different depths from the weight of the gas column were computed by a modified form of Method 2 of Rzasa and Katz.[6] The average of the difference without respect to sign between the measured and calculated pressures is 0.7 psi. Gold stylus points and white charts were used in the gage to obtain the deflections reported in Table 4, and the average difference of 0.7 psi. agrees with results obtained in laboratory calibrations using these materials.

By avoiding the sources of error in subsurface-pressure gages that have been identified by this investigation, it is believed that the Amerada-type gage will became even a more useful tool in petroleum and natural-gas research problems than it has been in the past.

Acknowledgments

The study of the inherent and avoidable errors in subsurface-pressure-gage determinations was made under the supervision of R. A. Cattell, chief petroleum and natural gas branch, Bureau of Mines, and H. C. Fowler, supervising engineer, and C. J. Wilhelm, engineer in charge of production research, Petroleum Experiment Station, Bartlesville, Okla.

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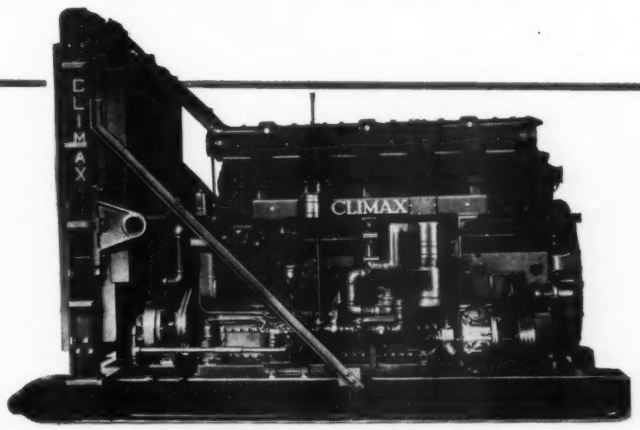

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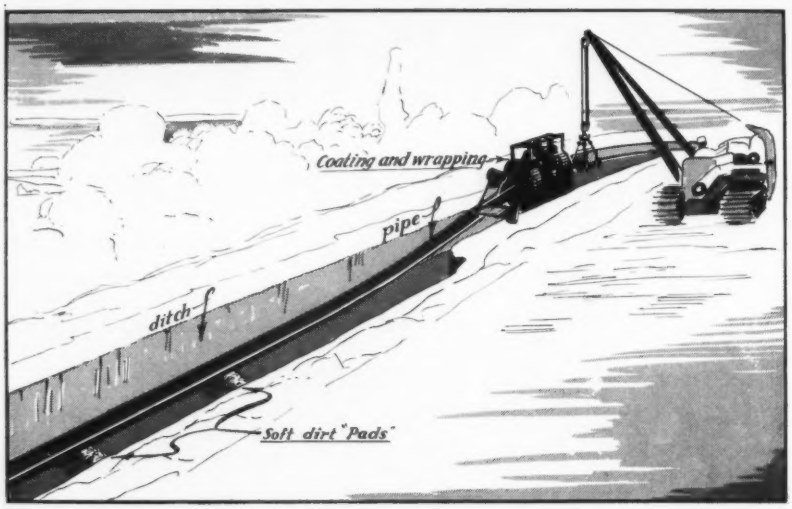


Pads of soft dirt 8 in. high and 1½ ft. wide are thrown in the ditch at approximately 30-ft. intervals to support doped pipe "cradled into the ditch" directly behind the dope machine. Pipe is cooled directly behind the dope machine by a circular spray which is not shown in sketch. Faster cooling is accomplished by spraying with water mixed with a wetting agent

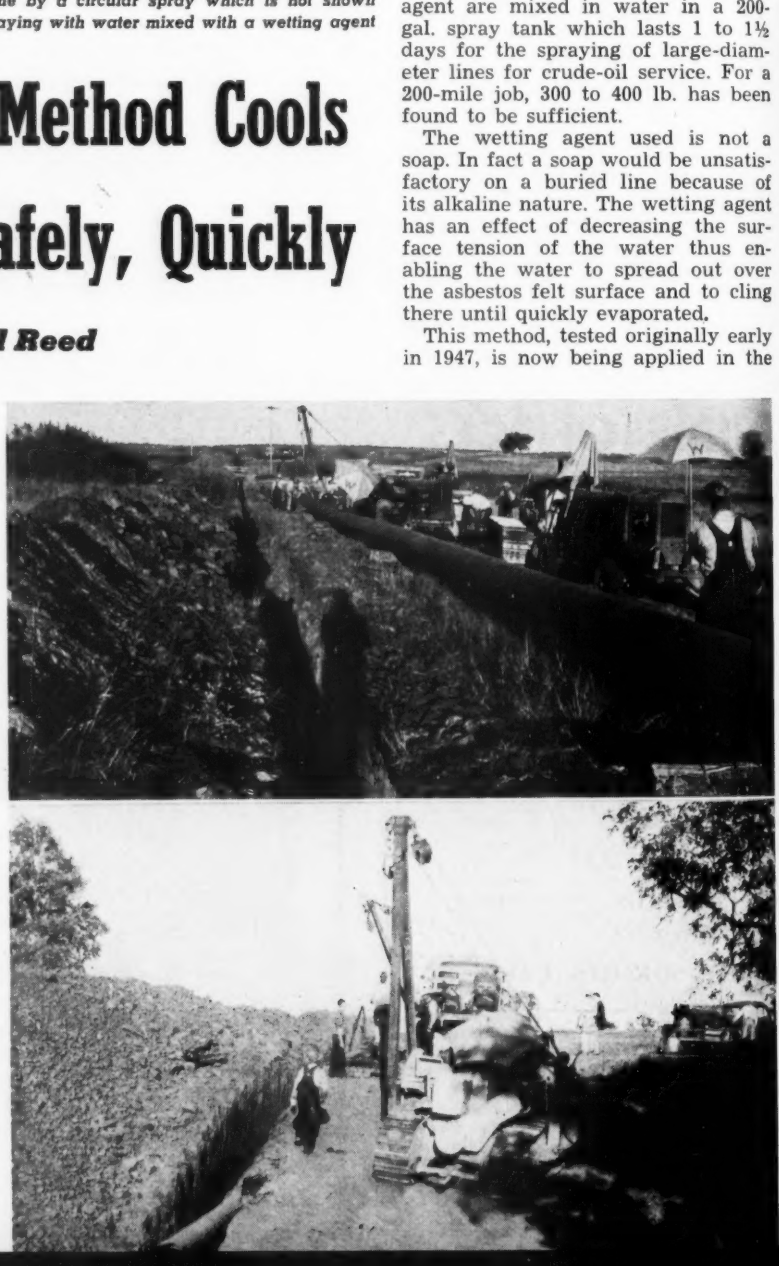
New Wetting Method Cools Doped Pipe Safely, Quickly

by Paul Reed

ON jobs where coated and wrapped pipe is lowered into the ditch directly behind the dope machine by the procedure known as "cradling into the ditch," it has been difficult to cool the pipe rapidly enough to have the coating congeal satisfactorily before the line finally rests on the ditch bottom. Untreated water applied by the usual spray devices either runs rapidly off the asbestos felt wrapping, or it clings to it in drops and bubbles which have less cooling effect than desired.

Stanolind Pipe Line Co., which has made a practice for many years of lowering pipe directly from the dope machine, is successfully applying a procedure which results in having the sprayed water cling to the entire surface of the asbestos felt. As a result, evaporation of water from all of the wrapped areas cools the pipe more effectively.

The procedure was devised by Raymond H. Crowe, engineer, who started to solve the problem by experiments with Dreft, a common household dish-washing agent. At first a few cartons of this material were mixed with water in the spray tank. Results were immediately satisfactory. The coating and wrapping cooled three times faster than when untreated water was used, and the coating was sufficiently hard for requirements. Observations were made entirely visually and by touching the wrapping by hand. An evidence of the improved evaporation has been the continual presence of a dense cloud of steam where water containing a wetting agent has been applied.



Bottom: Laying of 16-in. pipe across gulley in connection with looping program. Top: Welding 16-in. pipe for Stanolind Pipe Line Co. loop being done by the contractor, O. C. Whitaker Co.

Application of Agent

For satisfactory economical field operations, the cheapest wetting agent on the market has been bought in bulk from a chemical supply firm. After much experimenting, most satisfactory results have been obtained by procuring alkyl aryl sulfonate as the wetting agent.

Two coffee cans full of the wetting agent are mixed in water in a 200-gal. spray tank which lasts 1 to 1½ days for the spraying of large-diameter lines for crude-oil service. For a 200-mile job, 300 to 400 lb. has been found to be sufficient.

The wetting agent used is not a soap. In fact a soap would be unsatisfactory on a buried line because of its alkaline nature. The wetting agent has an effect of decreasing the surface tension of the water thus enabling the water to spread out over the asbestos felt surface and to cling there until quickly evaporated.

This method, tested originally early in 1947, is now being applied in the

laying of all coated and wrapped Stanolind lines.

The practice of the company is to coat with asphalt having a melting point of 210° F. This is applied at temperatures of approximately 450° F.

Effective cooling of coating removes an objection which has been raised against the direct lowering-in method (cradling into the ditch). This objection led to general adoption of customary procedure followed in the past 15 years or more of laying coated and wrapped pipe on skids to cool preparatory to lowering in the ditch.

In the past year the most extensive big-inch crude-oil construction was done for Stanolind Pipe Line Co.'s 20 and 22-in. looping of the Drumright, Okla.-Whiting, Ind., trunk line and for Magnolia Pipe Line Co.'s 20-in. Corsicana, Tex.-Patoka, Ill., 20-in. crude-oil trunk line. Together these total 1,085 miles of line. In the laying of these projects all pipe was laid directly behind the dope machine with water-spray cooling. Back filling of pipe except at slack loops follows directly only a few hundred feet behind the dope machine. By this practice, damage to coating at the points where pipe rests on skids is eliminated. Furthermore, there is a large saving in construction expense, for there is no longer the need for employing three to five large tractors for lowering-in operations early in the morning following the day when doping is done. Cost of handling skids is reduced. The direct-lowering-in method also removes the risk of loss from caving when a mile or so of ditch is left open behind doping operations during spells of rainy weather.

Direct-Lowering Procedure

Where direct lowering in is done, it is not customary to use holiday detectors as a regular practice. In some cases the chief inspector for the entire project carries a holiday detector in his car, available for use when he considers it advisable. For other projects no holiday detector is used, for tests have shown that the pipe is generally well protected when coating and wrapping is carefully handled.

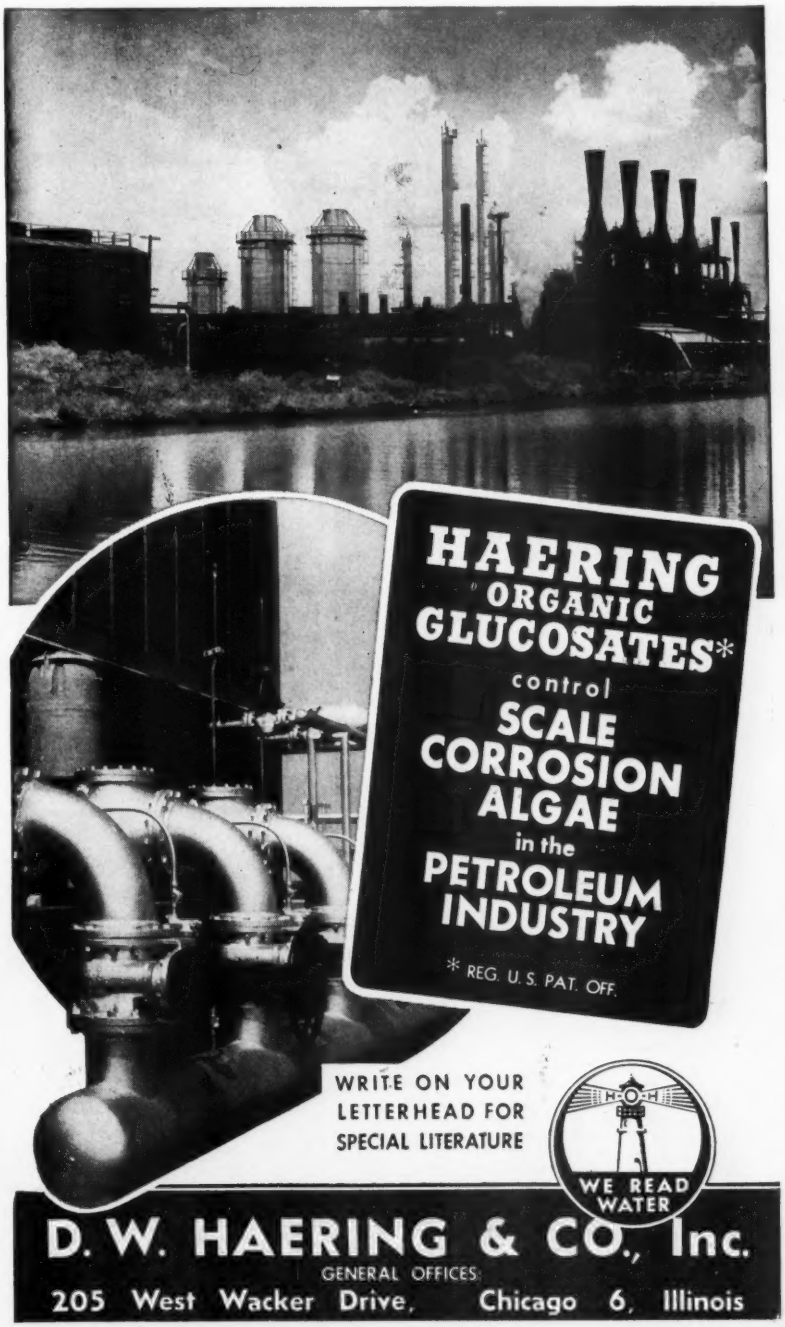
Thus in big-inch pipe-line construction the direct-lowering-in method eliminates a whole series of expensive operations including the laying of pipe on skids (which in some cases are cribbed on the right-of-way), operation of holiday detection instruments, patching of damaged coating and wrapping, and the customary lowering in by the use of several tractors.

Consequently, the only operations which follow the back filling immediately behind doping where direct lowering in is employed are those for lowering slack loops and cleanup.

A further advantage of cooling with a wetting agent is its effectiveness in preventing bagging of wrinkling which sometimes occurs in applications of extra-thick coatings with multiple wrappings.

The whole procedure of direct lowering in has been facilitated by another practice advocated by Crowe which provides for supporting doped pipe above the bottom of the ditch except for supports at approximately 30-ft. intervals. These supports consist of soft dirt padding thrown in by shovel every 30 ft. or so. Such padding is about 1½ ft. wide and 8 in. high. During the past year this method of padding has been used in the laying of all large-diameter doped lines of Stanolind Pipe Line Co. In the laying of the 516-mile, 20-22-24-in. crude-oil line being built this year by four pipe-line companies from Jal, N. M., to Cushing, Okla., this method of padding has been used.

These two simple methods, including the use of a wetting agent for cooling and the supporting of doped pipe in the ditch, have important economic value in safeguarding pipe-protection materials during cradling into the ditch. By the adoption of this direct-lowering-in procedure, labor and equipment are much reduced, risk is lessened, operations are simplified, and large savings are accomplished in construction costs.



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DIGESTS

HOUSTON A.A.P.G. REGIONAL MEETING

Digests of papers presented at Houston regional A.A.P.G. meeting, at Rice Hotel, December 2-3. General theme was "Problems of the Gulf Coast Geosyncline."

Recent Sediments of the Mississippi Deltaic Mass

H. N. FISK, Humble Oil & Refining Co., Houston.

THE Recent deltaic mass of the Mississippi River is a huge pile of seaward-thickening deposits which underlies the deltaic plain and Continental Shelf. It rests upon and buries a rugged surface sculptured during the last ice age when sea level was 450 ft. lower than at present. The sediments were deposited as the last Pleistocene ice sheets melted and sea level rose, and their main lithologic characteristics reflect the gradual lowering of stream gradients. The mass can be divided into a substream of permeable, gravel-bearing sands and a finer-grained topstratum of relatively impermeable, more heterogeneous sands, silts, and clays. Lithologic, textural, and faunal characteristics of depositional units within the topstratum are similar to those of sediments now accumulating within depositional environments of the region.

These environments are mainly marshland and prodelta marine, but they also include more restricted ones such as the fluviatile and brackish-water channels, bay and lake bottoms, and local beaches and spits. Interfingering and overlapping relationships of the various facies in the topstratum show that the Mississippi River changed its position many times while sea level was rising. That active subsidence accompanies the deltaic accumulation is shown by the seaward tilt of mapable marine beds within the mass and by the slope of the late Quaternary surface underlying the Recent deposits.

Stratigraphy of Frio Formation, Orange and Jefferson Counties, Texas

FRANK REEDY, JR., Division Geologist, Crown Central Petroleum Corp., Houston.

RECENT developments in the Gulf Coast of Texas has indicated the productive possibilities of many of the sands composing the lower portion of the thick Frio formation of Oligocene age. Exploration to the deeper sands of the Frio discloses facts of depositional conditions of this formation, which are as critical as structure for the accumulation of petroleum.

The area comprising northern Jefferson County and Orange County is herein considered as a stratigraphic unit. Electrical log, strike, and dip sections have been constructed indicating the basis for the correlations, the lithologic character of each of the zones of the Frio formation, and the calculated isopach interval of each zone. Diagrammatic dip sections have been drawn showing the relationship of lithology with microfauna occurrence. To interpret accurately these correlations and apply the zonation for a structural basis, three isopach maps have been constructed. These isopach maps indicate the extent of sands, their depositional position, and the development of the shale wedge.

In Orange and Jefferson counties the Frio (Oligocene) formation is divisible into three lithologic units: an upper unit consisting primarily of sands; a middle unit of marine shale; and a lower unit consisting of sands and shale. Isopach maps reveal the location of ancient offshore bars and reentrant basins and also show local thinning of beds in areas of structural uplift. The variation in stratigraphic position of certain foraminiferal associations is believed to be due to ecological changes and to the marine progressive overlap.

Salt Dome Configuration

MARCUS A. HANNA, Gulf Oil Corp., Houston.

FACTORS which cause modification of a symmetrical plug to the configuration of the various salt stocks found in the Gulf Coastal area are evaluated. This configuration includes the limestone, gypsum, and anhydrite caprock, as well as the spines, overhangs, leaning plugs, etc. Considered also are certain salt stock rimsynclinal effects, as well as some resulting structural changes in the surrounding sediments.

The character of the salt as a metamorphic rock, the orientated fabric of certain of the anhydrites, the modifications caused by density differences in the salt and surrounding sediments, the effect of circulating waters, etc., are cited. Several of the theories of salt-plug origin and growth are considered in light of present information.

Sedimentary Facies of the Upper Cenozoic and Recent in The Gulf Coast Geosyncline

SHEPARD W. LOWMAN, Shell Oil Co., Inc., Houston.

PRODUCTION of oil in the Tertiary formations of the Texas and Louisiana Gulf Coast is distributed in elongate trends that roughly parallel the present coast. These trends coincide with the distribution of shallow marine and brackish sedimentary facies in the producing zones. There are also three prominent crosstrends along which the majority of the production is concentrated. These coincide with the three transverse embayments that cut perpendicularly across the elongate producing trends. These crosstrends indicate the intersection of another set of sedimentary conditions which are related to the embayments.

Sedimentary facies is defined as the present aspect of the rock, including its fossil content. Fossil assemblages in the Recent characterize environments, such as brackish, Continental Shelf, and continental slope. These relationships seem to be readily applicable to the Tertiary, but the various methods of applying them, all require a broad empirical base of stratigraphic correlation. The network method of stratal correlation is described and the facies nature of formation and of fossil zones is discussed against the combined background of faunal control in the Recent and network of correlations in the Tertiary.

Sedimentary facies and stratigraphy in the Gulf Coast Upper Tertiary are applied to two general problems. First, the existence and probable character of the Gulf Coast geosyncline is considered; second, the stratigraphic and facies data are applied to the problem of subsidence under load.

Tertiary History of the Gulf Coast Geosyncline

M. M. SHEETS, Production Maintenance Co., Houston.

THE Gulf Coast geosyncline was first described by Barton and Ritz in 1933 as a long, narrow trough-shaped depression located parallel with and just inland from the shore of the Gulf of Mexico in Jefferson County, Texas. Since that time well data have made it virtually impossible for such a trough to exist at drillable depths under the land. Geophysical data completed within the last few years seems to eliminate the possibility of such a trough under the Continental Shelf. In light of the new data, the former idea of the Gulf Coast geosyncline in the form of a long, narrow trough must be changed to a new concept of a bowl-shaped depression corresponding more or less to the form of the present Gulf of Mexico. A great deal of additional data on sedimentation and structure, particularly faulting, supports this change in views.

This change in ideas may necessitate radical revision in the Tertiary history of the Gulf Coast, and doing so may cause radical revision of our ideas of the thickness and character of the Tertiary and post-Tertiary sediments near shore and under the Continental Shelf.

In general it now seems that the Tertiary history of the Gulf Coast involves the following fundamental principles:

1. A large semiround bowl-shaped depression in existence at the close of the Cretaceous and remaining relatively stable through the Tertiary.
2. Sedimentary filling of this depression during the Tertiary from the sides toward the middle.
3. Subsequent minor elevation of the north and west shores perhaps due to isostatic adjustment.

Photogeology in Gulf Coast Exploration

CHARLES W. De BLIEUX, Louisiana Land & Exploration Co., New Orleans.

THE Gulf Coast has long been noted for the absence of surface geology and topographic expression of subsurface structure. However, with application of geomorphology as a basic principle, aerial photographic interpretative techniques have been developed for this province. The deltaic plain of the Mississippi River and adjacent coastal marsh are selected for demonstration; approach to the problem is outlined, and photogeologic criteria are described and illustrated.

Exploration in the Gulf of Mexico With the Airborne Magnetometer

EUGENE FROWE, Robert H. Ray Co., Houston.

EXPERIMENTAL flights with the airborne magnetometer have been made over numerous structures in the Gulf Coast area to determine the correlation between magnetic profile and known geologic structures. The results of these flights are given to show this correlation and to compare the magnetic anomalies of offshore structures with inland structures. The magnetic effect of derricks and well casings is discussed.

Well-Head Stuffing Box for Armored Electric Cable

by D. B. Taliaferro and H. D. Hamontre†*

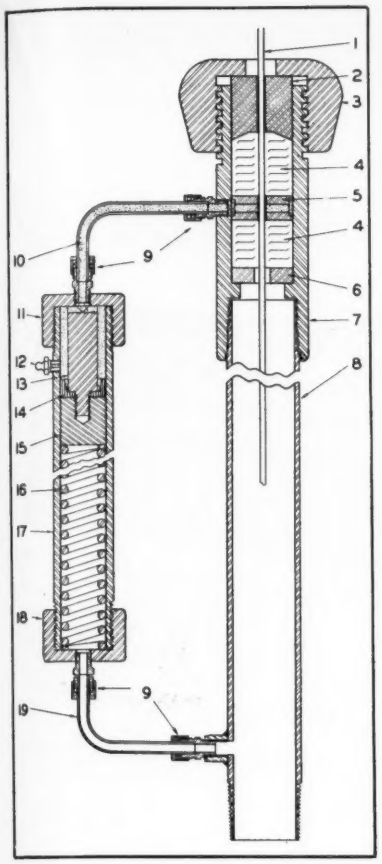

Fig. 1—(Left) Grease-packed stuffing box for electric cable

LEGEND

1. *Cable*
2. *Compression plug*
3. *Compression cap*
4. *Rubber seal*
5. *Lantern grease ring*
6. *Retaining ring*
7. *Outside shell*
8. *Lubricator barrel*
9. *Compression fitting*
10. *Grease*
11. *Cap*
12. *Grease fitting*
13. *Plunger stop*
14. *Leather cup*
15. *Plunger*
16. *Spring*
17. *Grease barrel*
18. *Bottom cap*
19. *Gas line*

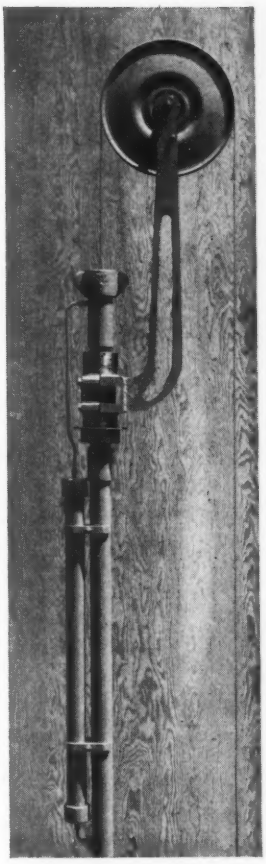

Fig. 2—(Right) Top of lubricator showing stuffing box, swivel head, and pulley

A WELL-HEAD stuffing box for armored electric cables has been designed, constructed, and used successfully under difficult conditions by Bureau of Mines engineers. It was built in connection with the development of an electrically operated testing instrument designed for use in oil, gas, or water-input wells under a pressure of 1,000 psi.

Within recent years many such electrical instruments have come into general use in the petroleum industry. These include electric-logging instruments, perforating guns, geophysical-prospecting instruments, calipers, and a variety of devices for measuring flow rates in wells. These instruments are run into wells on several types of electric cables, but the American Steel & Wire Co. Amagraph cable has been most widely used. The armored covering on this cable, consisting of two concentric layers of steel wires, protects the insulated electrical conductors and provides the necessary tensile strength to support the weight of the instrument and the cable. Many of the electrical instruments in general use are run into wells having a well-head pressure above atmospheric so it is necessary to run the cable through a packing gland or stuffing box.

In some respects the armor on the Amagraph cable makes it particularly suitable for use through a packing gland, but the irregular surface formed by the wires in the outer layer of the armor makes the cable difficult to seal in a conventional stuffing box. Some users of this cable have found that a Bowen‡ two-stage line wiper provided a satisfactory stuffing box if the well fluid is a liquid and if some leakage is permissible. The packing rubbers for these wipers are available for 5/16, ⅜, ½, 9/16, ⅝, and ¾-in. lines, and they have been supplied on special order for other sizes. The faces of the rubbers in contact with the line are slotted at intervals of about ½ in. to provide a staging of pressure, but for lines less than 5/16 in. in diameter it is believed that better results are obtained without the slots.

The instrument recently developed by Bureau of Mines engineers is run in wells on an Amagraph cable, 0.175 in. in diameter (size 1-H-O) where the well-head pressures range up to 1,000 psi. and where the fluid in the lubricator is air or natural gas. As successful use of the instrument depends upon elimination of leaks (at least, keeping the loss from leaks to a very small volume), it was necessary to develop an improved method of sealing the top of the lubricator. After some experimentation a stuffing box was developed which has proved entirely satisfactory under the described working conditions, and leakage around the cable point has been eliminated. Numerous inquiries have been received regarding this stuffing box, and it is described here as it is thought other users of Amagraph cables may find it the solution to a troublesome problem.

Fig. 1 is a schematic drawing of the stuffing box developed and Fig. 2 is a photograph of the top of a lubricator, showing the stuffing box, the swivel head, and pulley. As shown in Fig. 1, the seal is effected by injecting heavy grease under pressure between two sets of rubber seals (4) through which the Amagraph cable (1) passes. The grease thus effects a complete seal between the rubber packing and the cable, completely eliminating the leakage of gas through the stuffing box. This, of course, requires complete filling of the spaces between the wires making up the cable armor with grease. Although the volume of grease that flows past the rubber seals (4) is small, an appreciable amount is used to fill the irregularities in the surface of the cable so some method of replacing the grease and of maintaining pressure on it against the cable is required. A grease supply is provided in the auxiliary cylinder fastened to the lubricator. The grease is forced into the stuffing box by the pressure on the lubricator augmented by a spring (16) acting on a plunger (15). Expansion of the spring thus provides a constant differential pressure of 50 to 60 psi. between the grease-filled barrel (17) and the lubricator (8), regardless of variations in the working pressure on the lubrication.

*Principal petroleum engineer, and †associate petroleum engineer, Bureau of Mines, Bartlesville, Okla.

‡Manufactured by Bowen Co. of Texas, Houston.

Leading

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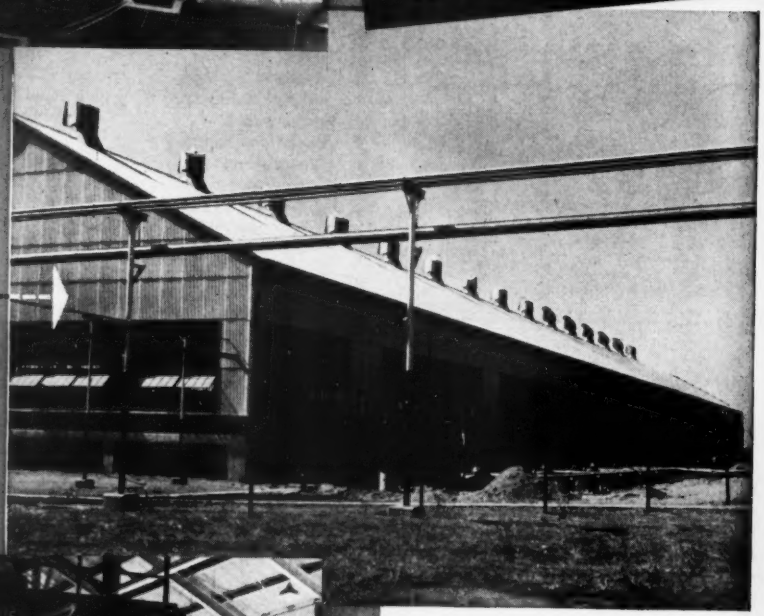

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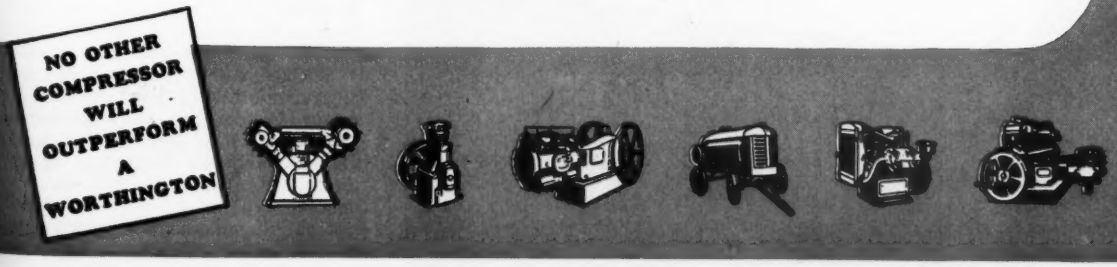

This differential pressure is adequate to flow the grease from the grease barrel (17) into the stuffing box and to maintain a positive grease pressure against the cable.

Construction Details

Several parts of a 1¾ by 2-in. Bowen two-stage line wiper were used in constructing the stuffing box proper. The Bowen line wiper contains two sets of packing rubbers through which the cable passes. Each of these consists of two pieces that form a cylinder approximately 4 in. long, split lengthwise to facilitate assembly on the cable. Under the working conditions encountered by the writers (maximum pressure, 1,000 psi.), it was found that 2-in. rubber seals were adequate, which made it possible to reduce the weight and length of the stuffing box greatly. The two sets of rubbers used were made by cutting a set of standard length in half. The upper part of the Bowen line wiper then could be eliminated and the lower body (part 7, Fig. 1) used to house the two sets of rubbers. The outer shell (7) is tapped near the center to provide a connection to the grease barrel (17). The upper and lower sets of packing rubbers are separated by a lantern grease ring (5), located opposite the connection to the grease barrel, and are retained by a retaining ring (6) at the bottom and a compression plug (2) at the top. Pressure is applied on the rubber seals (4) by the compression cap (3). The rubber seals (4), the lantern grease ring (5), the retaining ring (6), and the compression plug (2) are split vertically to facilitate the assembly of the stuffing box around the cable. The opening through the compression cap (3) and through the shoulder on which the retaining ring (6) rests are large enough to permit the passage of the instrument suspended on the cable. Thus, it is possible to remove the instrument and cable from the lubricator by unscrewing the compression cap (3) and removing all parts inside the stuffing box.

The compression cap (3), the retaining ring (6), the rubber seals (4) and the outside shell (7) are parts of the Bowen line wiper. The brass compression plug (2) supplied with the line wiper was replaced with an aluminum plug drilled to fit the cable snugly as the large opening in the original bushing left a large part of the rubber seal (4) unsupported. Experience to date with the stuffing box indicates that it might be well also to replace the retaining ring (6) with one that would fit the cable more closely.

The grease barrel (17) was made from a discarded 2-in. pump barrel. The construction is simple and the only precaution necessary is to provide a plunger stop (13), as indicated, to keep the leather cup (14) below the grease fitting (12) through which the barrel is filled with grease. The barrel is designed to hold about 1½ pt. of grease, which is injected with an ordinary zerk grease gun. A No. 25 front-wheel axle grease is used. If necessary, grease may be added while the system is under pressure. A valve (not shown in the figures) should be placed in the line between the grease barrel (17) and the outside shell (7) of the stuffing box so that the stuffing box may be dismantled without unloading the grease from the grease barrel. The spring was designed to exert a pressure of 50 to 60 psi. between the empty position and when loaded with 1½ pt. of grease.

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Synthetic Rubber and Oil-Type Carbon Black

(Continued from page 71)

contradict the relative tire-performance records of Philprene A and natural rubber (i.e., Philprene A tires have given better performance records than natural rubber in spite of its higher hysteresis loss) it should be emphasized at this point that Philprene A possesses greater stability to oxidative degradation. In other words, Philprene A compounds can probably tolerate higher operating temperatures than similar natural-rubber compounds without undergoing premature failure.

Shore hardness.—The Shore hardness values of the various stocks show Philprene A to be quite similar to G.R.-S. in this property. The data also show both synthetic rubbers to give slightly higher durometer values than the natural rubber stocks. The Philblacks and E.P.C. black all seem to give about the same hardness stocks but the durometer value for the S.R.F. and F.T. black stocks are lower in accordance with the reinforcement of these blacks.

Flex life.—In general, the flex-crack-growth resistance of Philprene is superior to G.R.-S. but considerably inferior to natural rubber. However, since the crack-growth characteristics of Philprene tires have shown equivalent if not superior performance to natural-rubber tires, two conclusions that may be drawn are (1) the method of test should be revised to approximate more closely the flexing action encountered by a tire tread, and (2) the superior resistance of Philprene A to oxidative degradation has a pro-

TABLE 1—ROAD TEST RESULTS, FOR PASSENGER-CAR TIRES

Tread compound—	Abrasion index at 50% of tread loss (%)	Estimated miles to smoothness	Miles/.001 in. nonskid at 50% nonskid loss	Cracks		
				Slight	To fabric 1-2 in.	To fabric 2+ in.
Test A:						
Natural rubber, E.P.C. black	100	35,200	62.3	>10	>10	>10
Philprene A type, Philblack O	118.5	46,700	74.0	None	None	None
Philprene A type, Philblack O	107.6	39,700	67.1	None	None	None
Philprene A type, Philblack O	116.5	44,200	72.6	None	None	None
Philprene A type, Philblack O	128.0	49,500	80.0	None	None	None
Test B:						
Natural rubber, E.P.C. Black	100	34,900	54.8	>10	>10	>10
Philprene A type,† Philblack O	121.5	39,400	66.6	None	None	None
Philprene A type, Philblack O	122.3	39,400	67.1	None	None	None
Philprene A type, Philblack O	117.4	38,200	64.4	None	None	None
Philprene A type, Philblack O	117.4	38,200	64.4	None	None	None
Test C*:						
Natural rubber, E.P.C. black	100	22,500	37.2	28	26	20
Philprene A type,† Philblack O	195.0	38,300	72.5	1	7	1
Philprene A type, Philblack O	195.0	38,300	72.5	2	5	None
Philprene A type, Philblack O	209.0	38,900	77.9	2	1	None

*Tires shelf aged for approximately 1 year before test. †41° F. butadiene-styrene elastomers copolymerized under slightly different conditions.

nounced effect upon the ultimate flex-crack-growth resistance of a tire tread.

Abrasion resistance. — The laboratory abrasion loss values were obtained on a modified Goodyear angle abrader operating for 3,000 revolutions with an 11° wheel angle and a 33-lb. load. The data show Philprene A and G.R.-S. to be quite similar but superior to natural rubber. During the past several years this laboratory has studied the operation of the modified Goodyear angle abrader and has found that this test gives a good indication of road wear when various blacks are compared in the same rubber, but that the test may give no indication of the relative wear of different rubbers. The lack of semi-quantitative agreement in the case of the different elastomers is disconcerting since the G.R.-S. is badly out of position with regard to both Philprene A and natural rubber.

Viscosity and extrusion characteristics.—Plots of these two properties show that Philprene A stocks give considerably stiffer stocks than either G.R.-S. or natural rubber. The rates of extrusion are also considerably higher for Philprene A than for G.R.-S. or natural rubber.

Road-Test Results

For the past several years Phillips Petroleum Co. has conducted extensive road tests on various types of vehicles and under widely differing test conditions with the purpose of determining the relative tire-tread performance capabilities of various carbon blacks and rubbers. For example, during the past 5 years that Philblack A has been commercially available, over 18 million miles of road testing comparing Philblack A to channel black have established that this black has an abrasion index of 89 per cent of that of channel black in addition to giving improved cut and crack-growth resistance.

Since the first varieties of Philprene A were produced on a sufficiently large pilot-plant scale to permit tire testing, numerous road tests have been conducted on the low-temperature chemical rubber. In Table 1 are reported some of the results developed during the past year.

It is seen that the natural rubber-channel black tread tires gave very excellent road-performance records with the average miles to smoothness running from 22,000 to 35,000 miles, respectively, but that the tire performance of the various Philprene A type rubbers reinforced with Philblack O has been much better with improvements ranging from 8 to 109 per cent in abrasion resistance. In addition, the crack-growth resistance of the Philprene A-Philblack O tires has been superior to the natural rubber-channel black controls.

Also, various tests have been run comparing Philprene A to G.R.-S. and G.R.-S. 10 and the average results of some 20 different road tests show Philprene A to be about 25 per cent superior in abrasion resistance in addition to imparting better cut and crack growth resistance.

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THE OIL AND GAS JOURNAL

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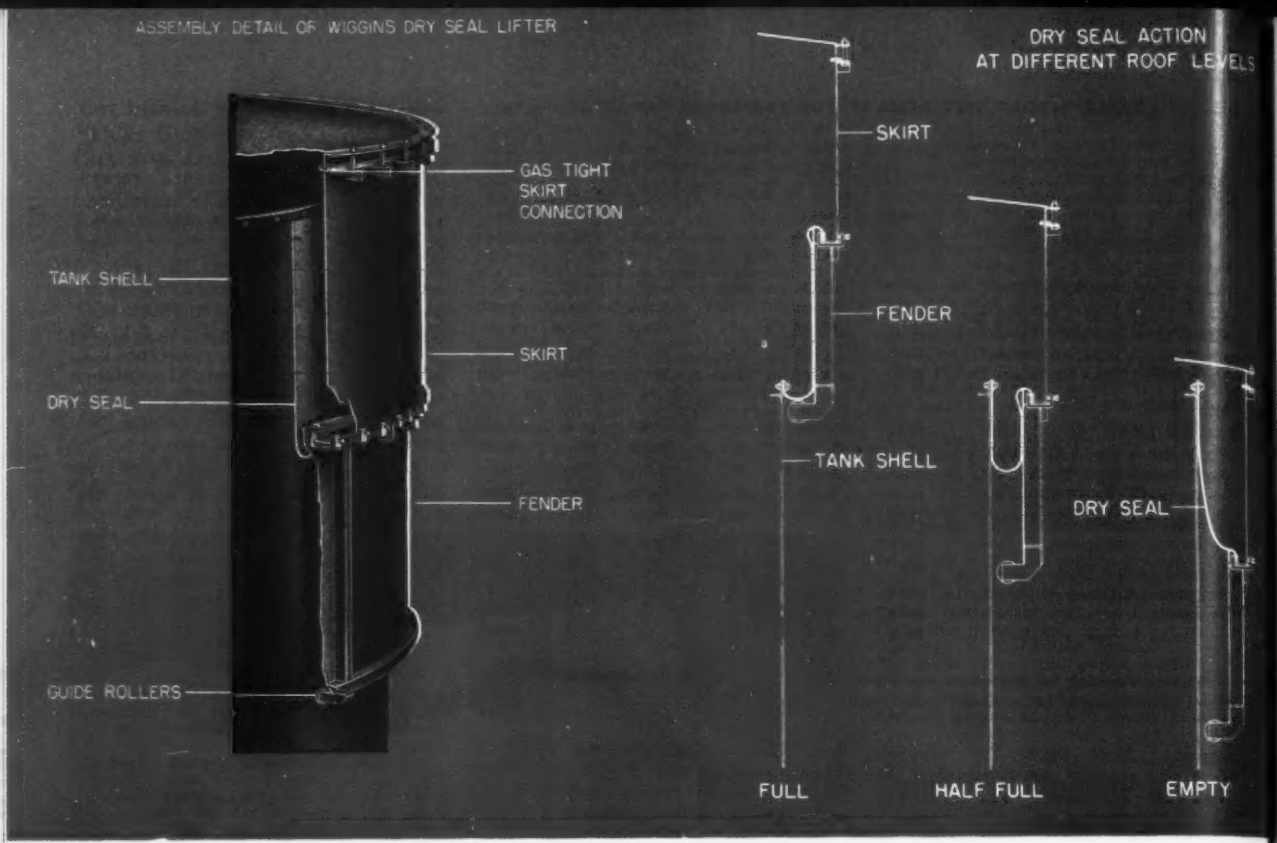

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Caustic Potash for High-Octane Gasoline

We should like very much to get some information on the use of caustic potash in the production of high-octane gasoline.—W. H. S.

The only use of caustic potash that occurs to us in connection with high-octane gasoline is the use of potassium salts of isobutyric acid, alkyl phenols, cresols, methanol, or naphthenic acids in the solutizer or related processes. In these processes the objectionable lower-boiling mercaptan sulfur compounds are removed by dissolving them in so-called solutizer agents. The removal of the mercaptan enables the resulting gasoline to react favorably to the addition of tetraethyl lead, i.e., to exhibit a high lead susceptibility. In this somewhat indirect way, caustic potash can be said to be related to the production of high-octane gasoline. However, the cheaper sodium hydroxide is probably used more extensively than potassium hydroxide.

Rubber Asphalt Compounds

Where can we find material on the properties of asphalt rubber mixtures?—F. F. C.

Most of such studies have been made by European scientists. A somewhat recent paper was published in French by J. M. van Rooijen (Rev. Gen. Caoutchouc 22, No. 12, 237-243, 1945, and Chimie et Industrie 56, No. 3, 226, 1946). The following is a fairly complete abstract:

The effect of temperature on asphalt rubber mixtures was studied, including variations in rubber content and kind of asphalt. The melting point and penetration of each mixture were measured and the mixtures were examined under the microscope and by visual inspection. Five per cent of rubber caused the mixture to harden gradually upon heating and they became smooth in appearance but the 10 per cent mixtures became soft after heating. The 10 per cent mixtures became more and more granular in appearance and at 235° C. they softened rapidly, and then tended to harden upon heating for 4-5 hours. Microscopic examination indicated that this behavior was due to changes in the colloidal state. The rubber particles were originally in suspension in the asphalt but continued heating caused a reversal of phase so that the depolymerized rubber became the continuous phase. Coagulation of the asphaltenes may also occur. Large percentages of rubber tend to encourage the reversal of phase and light hydrocarbons have the same effect, causing the volume of the swollen rubber to increase. The phenomenon of softening and granulation disappears upon long heating, apparently because chemical changes occur. Practical tests indicate that mixtures containing more than 7½ per cent of rubber with blown asphalts are not stable at high temperatures or when long heated.

A.S.T.M. Versus True Boiling Distillation

In trying to compute the fractionation that occurs in a tower we need the relation between A.S.T.M. and true boiling distillation curves. What data are there on this subject?—R. C. N.

Only two major references exist on this subject. In 1939, Milton Hansburg suggested a correlation in a master's thesis at Universty of Tulsa. However, only about 15 sets of data were available to him. His work is reported in The Oil and Gas Journal of August 3, 1939, page 45 and also in the second edition of Petroleum Refinery Engineering, page 253 (McGraw-Hill Book Co., Inc., New York).

A more complete study is that of R. L. Geddes (Computation of Petroleum Fractionation) in Ind. Eng. Chem., 33, 795 (1941). He reports on about 70 samples, and finds a more satisfactory but also more complicated relationship between the two types of curves.

The general shape and position of the center section (20-80 per cent range) of the true-boiling-point curve can be computed with satisfactory accuracy by either of the methods mentioned above. This, however, is of little value with regard to studies of fractionation because only the extreme ends of the distillation curve are altered by degree of fractionation.

The correlation between the 90 per cent points (or any points between 90 and 99 per cent) of the two distillation curves is not really satisfactory. However, the general situation is indicated in Tables 1 and 2.

An examination of the data of Tables 1 and 2 shows that the correlation between A.S.T.M. and T.B.P. 90 per cent points and between end points and corresponding T.B.P. points is not at all exact. This is certainly unfortunate because we have little hope of extensively checking the plate efficiency, degree of fractionation, etc., of heavy-oil fractionating towers until such a correlation is available.

With respect to correlation of the front ends of A.S.T.M. and T.B.P. curves, substantially no correlation methods are available. This lack is natural, inasmuch as the front ends of commercial products are usually the result of steam-stripping operations rather than fractionation. In addition, many of the available data are based on straightrun gasoline, and the front end of such a material is inherently the same as it was in the raw crude oil, rather than a result of fractionation.

TABLE 1—RELATION OF 90 PER CENT A.S.T.M. AND T.B.P. POINTS (About 95 Points)

A.S.T.M. 90% point (°F.)	T.B.P. 90 per cent point minus A.S.T.M. 90 per cent point, °F.		No. of points	
	Average	Range of data	Above average	Below average
150	9.0° F.	6 to 15° F.	2	1
200	10.7	10 to 14	1	1
250	12.5	0 to 25	5	2
300	14.3	0 to 24	6	18
400	17.0	0 to 31	9	23
500	21.7	2 to 31	6	9
600	25.3	3 to 27	1	9
700	28.7	28 to 37	1	1

TABLE 2—RELATION OF A.S.T.M.-END POINT MINUS T.B.P. TEMPERATURE AT THE SAME PERCENTAGE AS THE A.S.T.M.-END POINT (About 75 Points)

A.S.T.M. end point (°F.)	T.B.P. point minus A.S.T.M.-end point, °F.		No. of points	
	Average	Range of data	Above average	Below average
200	(—5)	0 to (—25)	3	2
300	3	(—2) to 36	9	1
400	14	(—10) to 60	13	19
500	26	15 to 39	6	9
600	37	17 to 44	8	2
700	47	10 to 100	1	2

New Process Developed to Produce O_2 From Air for Petrochemical, Other Operations

by B. H. Van Dyke

This article describes, in condensed form, a system for production of oxygen from air. Developed by Elliott Co. engineers, the process employs air distillation at atmospheric pressure combined with nitrogen liquefaction and refrigeration, to provide high operational safety and flexibility.

Recovery of oxygen from the air charged to the system is over 95 per cent and purity of the nitrogen leaving the process is over 99.5 per cent. Oxygen of any purity can be made and a plant designed for producing 95 per cent purity gaseous oxygen can also produce simultaneously 99.5 per cent purity material.

The author is manager of Elliott's new-products department, at Jeannette, Pa.

HUGE quantities of relatively high-purity oxygen are necessary in the manufacture of many petrochemical materials. Some of the petrochemical processes, such as the synthetic-gasoline plant projected at Brownsville, Tex., will consume as much as 45 million standard cubic feet per day of oxygen in its operations. Large quantities also are employed in other natural gas-oxidation processing operations previously described in The Oil and Gas Journal (April 12, 1947, page 76).

A new process for producing O_2 from air for petrochemical and other operations has been announced recently by Elliott Co., Jeannette, Pa. A general, nontechnical description of the process follows.

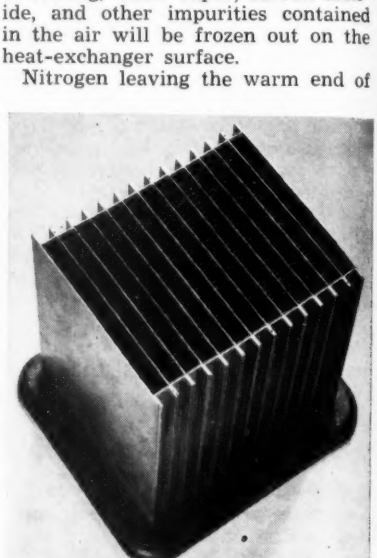
Air enters through filter (1) and is compressed (2) to a pressure only sufficiently above atmospheric to overcome friction loss in the equipment. A portion of the incoming air is compressed to the same pressure through the expander blowers (15), which parallel the air charging blower (2). This discharge from the expander blower joins with the discharge from the air-charging blower and flows into the bottom of a double scrubbing tower (4).

The air is dehumidified and freed of dust before entering the cleanup heat exchangers which is accomplished by the use of a scrubbing tower in two stages (4) and (5). In section (4), ordinary circulating water is used, whereas in section (5) recirculating refrigerated water is employed so that the air leaving the top of the scrubbing tower will be at approximately +40° F., dust-free and saturated with water vapor. Power required for the refrigeration system (6) is small.

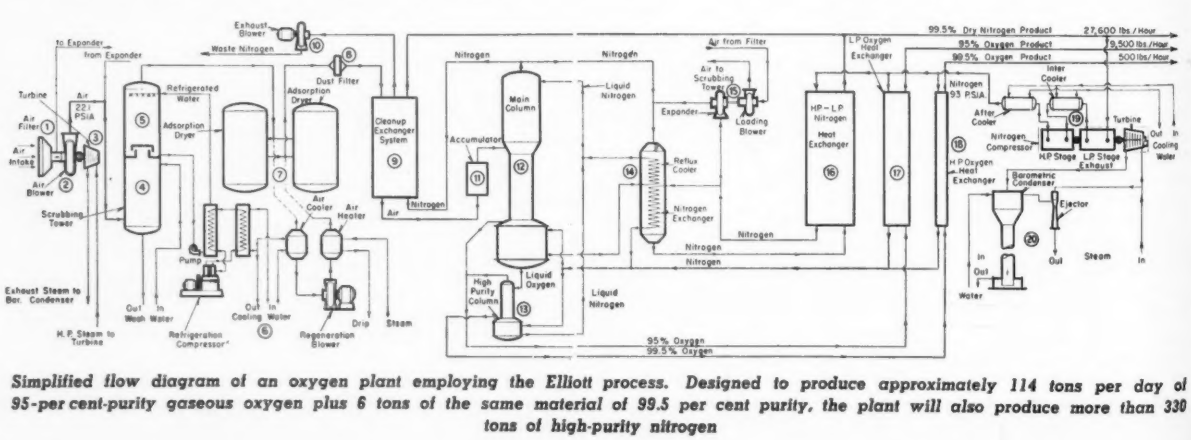
Next the air is further dehumidified by passing through an absorption drier (7). This is a conventional system using activated alumina or similar desiccant and is provided in duplicate for regeneration. The air leaving the drier will be at a temperature of approximately +70° F., and a dew-point of —40° F. A dust filter (8) is provided to remove traces of dust which might break loose from the drier during the early stages of operation.

In the cleanup heat-exchanger system (9), the air is cooled to a temperature of approximately —310° F. Nitrogen from the top of the column (12) is used as the cooling medium and enters the heat exchangers at approximately —318° F. In the process of cooling, water vapor, carbon dioxide, and other impurities contained in the air will be frozen out on the heat-exchanger surface.

Nitrogen leaving the warm end of



Section model of gas-to-gas heat exchanger employed in the Elliott cycle. Mechanical design of the exchanger is such that it may be manufactured on a mass-production basis. Effective surface per cubic foot of exchanger volume runs to more than 300 sq. ft. On a weight basis this type of exchanger provides over 3.5 sq. ft. of surface per pound of metal



Simplified flow diagram of an oxygen plant employing the Elliott process. Designed to produce approximately 114 tons per day of 95-per cent-purity gaseous oxygen plus 6 tons of the same material of 99.5 per cent purity, the plant will also produce more than 330 tons of high-purity nitrogen

the cleanup heat exchanger will be at a temperature approximately 8° to 10° F. lower than the entering air. This nitrogen is bone dry and is used in quantity as required to regenerate or remove deposited impurities from the heat exchanger. The system is arranged so that through a combination of automatic valves on a fixed time cycle one heat-exchanger bank at a time is switched from service and purged of deposited impurities.

Experimental operation of the pilot plant indicates that approximately 10 per cent of the effluent nitrogen is required for this purpose. Since the flow of nitrogen through the heat exchanger being cleaned will be in series with the flow of nitrogen leaving the heat exchanger in service, it is necessary to provide sufficient pressure from the charging blower (2) to overcome this additional head. A small exhaust blower (10) handles the small amount of nitrogen which is required for the cleanup operation through the exchanger being cleaned. The nitrogen discharging from this blower will then carry to waste all of the impurities previously deposited from the air.

An accumulator (9) is provided in the air stream between the cleanup heat-exchanger system and the main column to balance out the pressure and temperature fluctuations which occur to a slight degree when a heat exchanger is switched. In this system the differential pressure between the two sides of the heat exchanger which are being switched is only a few pounds gage; thus the surge is very slight, and the operation takes place only once every 4 hours instead of every few minutes. The accumulator not only serves in preventing disturbances on the feed tray during these periods but also acts as a safety factor in the removal of acetylene.

The air leaving the equalizer or accumulator enters the main column (12) at the appropriate tray. Essentially pure liquid nitrogen is supplied to the main column as reflux. The quantity is controlled to effect the most economic separation of oxygen from the air charged. The overhead gas from the top of the main column will be at a few pounds gage pressure and at a temperature of approximately —318° F., and a purity of approximately 99.5 per cent. A portion of this nitrogen is used in the cleanup heat exchanger to precool the air. Another portion passes through heat exchanger (14), which is a combination reflux cooler and high-pressure nitrogen exchanger. This heat exchanger warms up the nitrogen a few degrees and, in so doing, subcools the reflux to minimize flashing before it enters the main column. The nitrogen exchanger section provides a means of cooling high-pressure nitrogen to liquefaction temperature.

Low-pressure nitrogen leaving heat exchanger (14) passes into another gas-to-gas heat exchanger (16), is warmed up to approximately 60° F., and joins with the nitrogen which is under the same conditions of temperature and pressure leaving the cleanup heat exchanger. A portion of this high-purity dry nitrogen stream is delivered as useful product. The remainder is recycled to the process for making reflux and refrigeration. This portion passes downward into the suction of the nitrogen compressor (19).

The nitrogen compressor is the principal user of power. It is an Elliott multistage centrifugal compressor with a conventional inter and aftercooler. The nitrogen gas is compressed to approximately 93 psia.

Split Three Ways

On leaving the aftercooler the compressed nitrogen stream is split into three ways, one through each of exchangers (16, 17, and 18). The bulk of the flow is through exchanger (16) in which heat is exchanged against the low-pressure cold nitrogen leaving the top of the fractionating column and exchanger (14). This high-pressure, low-pressure nitrogen heat exchanger is simply a "bootstrap" device for the purpose of raising the temperature level of the low-pressure cold nitrogen gas to a point where it can be conveniently handled in a compressor, then putting the cold back into the high-pressure stream.

A sufficient quantity of the nitrogen leaving exchanger (16) passes through the turboexpander (15) as required to produce the entire amount of refrigeration for the plant. The temperature to the expander is approximately —253° F., leaving at approximately —318° F. The energy from the expander drives an integral centrifugal blower which parallels and correspondingly reduces the power required by the charging air blower. The expander discharge joins with the stream of cold, low-pressure nitrogen coming from the top of the main fractionating column.

The remainder of the high-pressure nitrogen stream leaving exchanger (16), which is not diverted into the expander, passes down through the nitrogen exchanger section of heat exchanger (14) and joins with the cold high-pressure nitrogen streams coming from the exchangers (17) and (18). The combined streams then enter the nitrogen sides of the reboilers of the main and high-purity columns. At this point the nitrogen is liquefied by condensing against the liquid oxygen on the other side of the reboiler tubes. This provides the heat to boil off the oxygen products and to provide vapor loading for the columns. The liquid nitrogen is controlled by a liquid-level controller and passes up to the top of the main column as liquid nitrogen reflux. No pump is required since the top column pressure is always considerably less than the pressure in the nitrogen side of the reboiler.

Reflux quantity may be varied simply by increasing or decreasing the speed of the nitrogen compressor. This function is entirely independent of the amount of air charged to the system. It is this separate control over the making of nitrogen reflux and the supply of refrigeration that gives this system its extremely high percentage of oxygen recovery and a wide latitude in operational flexibility. The quantity of liquid nitrogen required for this distillation can be related to a temperature difference between the top of the column and a point approximately five trays further down. This phenomenon can be utilized by means of a temperature-difference controller to control the speed of the turbine driving the nitrogen compressor so that under any condition of operation of the plant the amount of liquid nitrogen supplied as reflux will always be the optimum quantity equivalent to the lowest total horsepower per unit of useful product.

Distillation takes place in the column and results in liquid oxygen collecting in the reboiler at a purity corresponding to the purity of the principal oxygen product, which for the case being described is 95 per cent. The gaseous oxygen product is taken off at approximately 5 psig., and the corresponding saturation temperature and warmed up to room temperature through heat exchanger (17). Thus the cold from the oxygen product is returned to the system via the high-pressure nitrogen stream.

The system can make both high-purity and low-purity oxygen simultaneously. A small stripper column (13) is situated at a level beneath the main column in such a manner that 95 per cent purity liquid oxygen feeds as overhead to the top of the high-purity column. The overhead gas from this column will be essentially 95 per cent purity gaseous oxygen and simply joins with the low-purity gaseous oxygen stream. The high-purity oxygen product is taken off above the liquid level of the oxygen in the reboiler of the high-purity column and gives up its cold by exchange against some of the high-pressure gaseous nitrogen from the nitrogen compressor through exchanger (18), and is delivered at essentially room temperature as the high-purity product.

The nitrogen side of the reboiler of the high-purity column parallels the nitrogen side of the reboiler of the main column. The condensing of nitrogen in this reboiler provides the the heat to boil off the high-purity oxygen product and the vapor loading for the operation of the column. The liquid nitrogen condensed in the reboiler flows by its own pressure head and joins with the liquid nitrogen going into the top of the main column.

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7. Estimating Gas Reserves

THE behavior of a gas reservoir can be expressed by the gas law PV = ZnRT. In particular, if this equation is written at zero time (representing original reservoir conditions) and again at a time when there has been a withdrawal of gas and accompanying pressure decline, the following equation results:

$$\frac{P}{Z} = \frac{P_o}{Z_o} - \frac{14.7\,T_f\,V_g}{520\,V_p} \quad (1)$$

where

P_o = original reservoir pressure psia.
Z_o = compressibility factor at P_o
V_g = number of standard cubic feet of gas (at 14.7 and 520° R.) removed from the reservoir
P = the reservoir pressure when V_g standard cubic feet have been withdrawn, psia.
Z = the compressibility factor at P
T_f = the formation temperature, °R.
V_p = the pore volume of the reservoir occupied by gas, cu. ft.

The equation gives a relationship between variables which allows one to solve for the produced gas when pressure has reached abandonment, to solve for the reservoir volume when pressure and production is known, or to solve for the pressure when a certain production will be reached. It is based upon a constant volume reservoir.

Example

The chart prepared for this equation lists the quantity ($P_o/Z_o - P/Z$) as a unit $\Delta P/Z$. As an illustration of the chart's use, for a reservoir under original pressure of 1,100 psia. and a reservoir temperature of 120° F. where the Z factor is 0.85, 12×10^9 standard cubic feet of gas have been produced when the reservoir pressure has fallen to 700 psia. (where Z = .92).

To estimate the total gas which was originally in place and the pore volume of the reservoir, proceed as follows:

$$\Delta\frac{P}{Z}\quad \frac{1{,}100}{.85} - \frac{700}{.92}$$

$$= 1{,}295 - 760 = 535$$

Using $P/\Delta Z = 535$; $T_f = 580$; $V_g = 12 \times 109$, then the chart gives $V_p = 3.6 \times 10^9$ cu. ft.

Now using this value of V_p and $\Delta P/Z = 1{,}295 - 100 = 1{,}195$, a value of V_g equal to 255×10^9 is read as the total gas produced if abandonment is made at 100 psi.

It is to be noted on this chart that the units of V_p and V_g are the same and can be read in multiples of 10 provided both scales are so used.

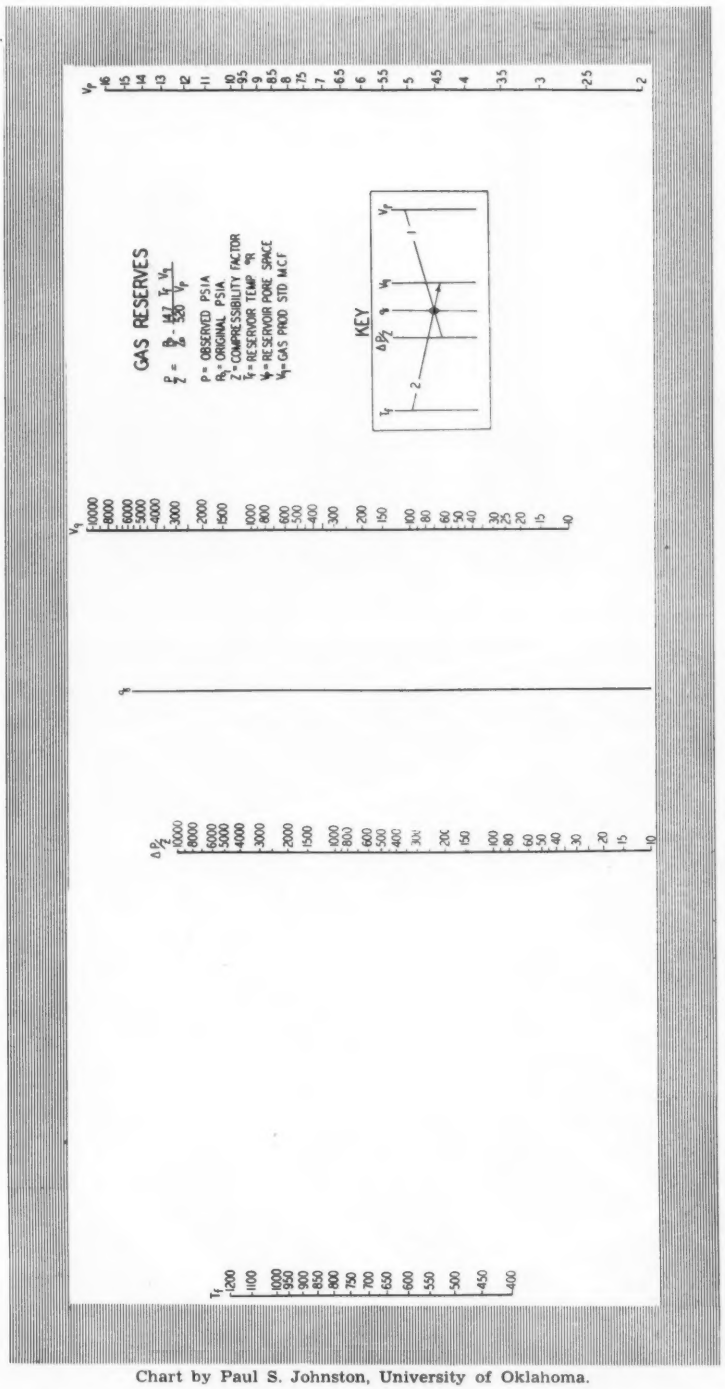

Chart by Paul S. Johnston, University of Oklahoma.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

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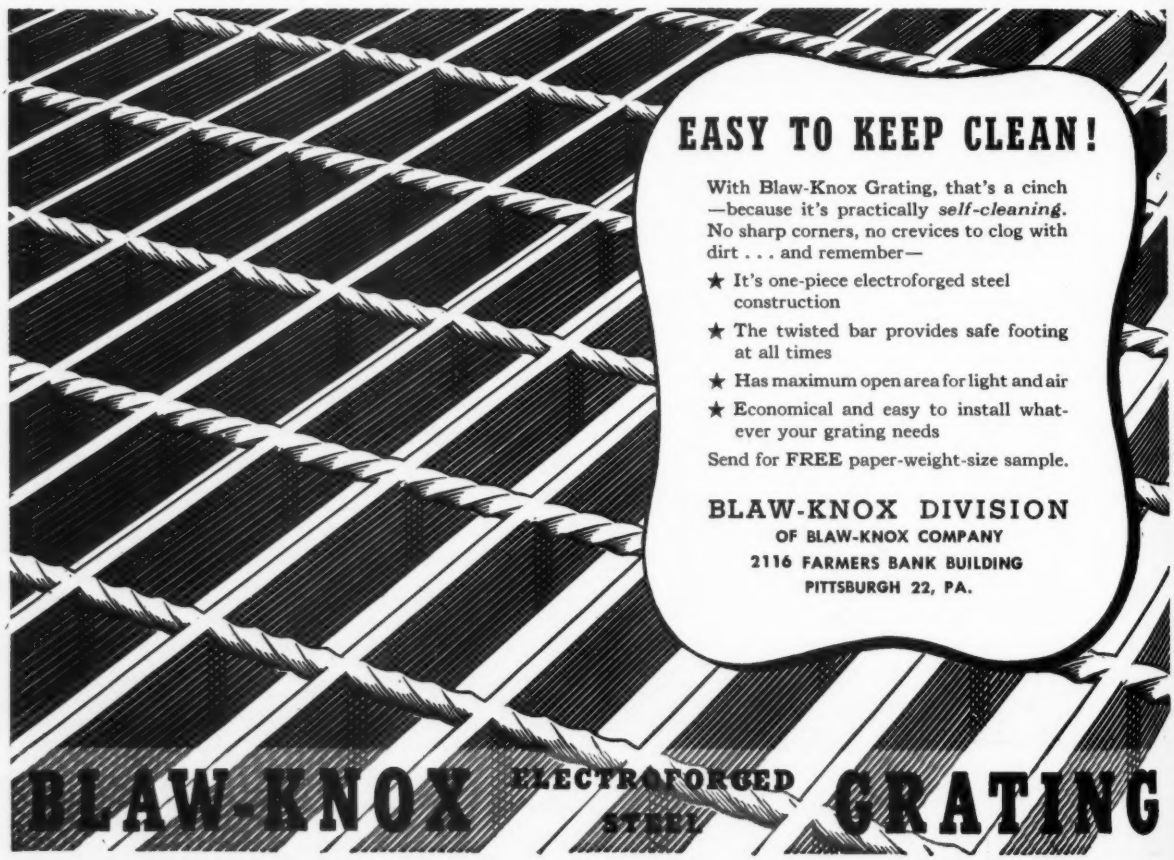

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Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Summary Sheets for Cost Estimates

Item—	M. & L. per cent	Labor, per cent of material	Notes
1-9. Direct-fired heaters (pipe stills) including superheaters, stacks and foundations; towers, vessels, separators, absorbers, and strippers; heaters or coolers (tubular or open box); pumps, engines, compressors, motors or drives; power (steam or electric); rundown storage; and miscellaneous filters, mixers, etc.	.....	.....	These items must be computed in detail. They (and other items) will be discussed in separate installments of the Refiner's Notebook
10. MAJOR OR BASIC PROCESS EQUIPMENT	15-50[1,2,6]	20[1]-40[1]	Happel[2] suggests M. & L. is only 15-30%
11. Piping, process	12-50[1,2,6]	70-100[2]	M. & L. is 30-62% of Item 10[1] Author[3] finds some labor runs 156% of material
12. Insulation, fireproofing, and paint	1-4.5[2]	200-600[7]	M. & L. is 5-15% of Item 10[2] Happel[2] suggests labor is only 120-150% of material
13. Instruments	4-12[1]	23[2]-36[1,6]	M. & L. is 10-25% of Item 10[2]
14. Foundations, except on buildings, pipe stills and boilers	0.5-2.4[2]	75-150[2]	M. & L. is 4-8% of Item 10[2]
15. Structural steel frames, walkways, and platforms	0.5-3.0[2]	30-50[2]	M. & L. is 2-10% of Item 10[2]
16. Buildings, process	4-12[1]	100[1]-250[2]	M. & L. is 10-25% of Item 10[1]
17. Electrical wiring—service and lighting	1-4[3]	150-200[2]	.....
18. Sewers and drains for process units	under 1	.....	.....
19. Miscellaneous	.....	.....	.....
20. AUXILIARY PROCESS EQUIPMENT (alone)	30-75	.....	.....
21. Temporary construction—office and tool house, roads and sidings	low	.....	.....
22. Tools and rental of rigging or other equipment	0.2-1[3]	.....	.....
23. Superintendent, timekeeper, accounting, etc.	1-4[3]	.....	.....
24. Testing equipment, and acceptance runs	2-9[1]	.....	.....
25. FIELD OFFICE EXPENSES (alone)	4-12	.....	.....
26. Drafting labor and supplies	.....	.....	.....
27. Preliminary designs and cost estimates	1-5[5]	.....	.....
28. Engineering design, final	2-9	.....	.....
29. Overhead, travel, correspondence, finance, etc.	2-10[2]	.....	.....
30. HOME OFFICE EXPENSES (alone)	6-21	.....	.....
31. PLANT COST—DIRECT TOTAL	**100**	.....	.....
32. Premium time—over 40 hours per week	up to 16% of labor	.....	.....
33. Insurance, taxes, liabilities, old age, etc.	8-10% of labor	.....	.....
34. Contingencies	7-15[2,3,4]	.....	Harris[1] suggests 10-20%
35. Profit	7-15[2,3,4]	.....	May be 20-30% on small jobs
36. PLANT COST—TOTAL	126-135	48[1]-59[1]	.....
POSSIBLE AUXILIARY SERVICES OR COSTS			
37. Storage—crude and product	4-25[1]	20-35[2]	M. & L. is 10-50% of Item 10[1]
38. Buildings—offices, laboratory, warehouses, etc.	.....	82-190[3]	Only 32-42% for galvanized iron
39. Land—cost, title, clearing, surveying, draining, etc.	.....	.....	.....
40. Fire-fighting equipment	.....	.....	.....
41. Piping, general—transfer, water, air, steam, sewers, drains, etc.	.....	.....	.....
42. Misc. loading racks, railroad spurs, docks, canning equipment, etc.	.....	.....	.....
43. Chemicals, solvents, catalyst charges, etc.	.....	.....	.....
44. Royalties, paid up	.....	.....	.....
45. Inventories—laboratory, warehouses, etc.	.....	.....	.....
46. Mechanical, carpentry, welding, etc., shops	.....	.....	.....
47. Operating capital	12-47[8]	.....	.....

*Including panel, board labor and accessories.

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No. 8 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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PIPE LINES

Tennessee Gas Reports Big Delivery Increase

DELIVERIES of natural gas to the East by Tennessee Gas Transmission Co. have almost doubled since the first of this year with the completion of its 1948 construction program ahead of schedule.

The company's system is now delivering in excess of 605,000,000 cu. ft. of gas daily, which should help alleviate the shortage of gas in the Appalachian area this winter, Gardiner Symonds, president of Tennessee Gas, said. He explained that accelerated deliveries of pipe were responsible for the rapid completion of a major portion of the second parallel line from South Texas to West Virginia. These deliveries were made possible mainly by trade-out arrangements with other pipe-line companies.

Additional facilities put in service during 1948 included approximately 710 miles of main pipe line loops and 83 miles of lateral line to Carthage field in East Texas, and approximately 74,000 additional compressor horsepower in existing compressor stations. The company now has in operation about 2,500 miles of large diameter pipe and 15 compressor stations with the aggregate of approximately 217,000 compressor horsepower.

Tennessee Gas has permission from the Federal Power Commission to further increase its capacity to 660,000,000 cu. ft. daily and work on this project will be continued in 1949.

In a recent report by the company it was disclosed that the net earnings for the third quarter of 1948, ended September 30, were $1,524,497, or equal to 63 cents per share of common stock outstanding on September 30, prior to the recent stock dividend.

The report revealed the company has made a transportation agreement with Manufacturers Light & Heat Co. of Pittsburgh to transport for them approximately 111,000,000 cu. ft. of gas daily. To do so the company must construct, with approval of Federal Power Commission, a portion of the facilities for which it has previously applied in connection with its Buffalo extension. Permission has been asked to construct 338 miles of 30-in., 330 miles of 26-in., and 86 miles of 24-in. main-line loops, and add approximately 27,200 compressor hp. at existing or authorized compressor stations. Estimated cost of these facilities is approximately $65,500,000.

Socony-Vacuum Products Line Is Nearing Completion

Laying of 155 miles of 8-in. products line for Socony-Vacuum Oil Co., Inc., between Malvern, Pa., and Binghamton, N. Y., is nearing completion with only a few miles remaining to be laid. The contractor, Midwestern Constructors, Inc., is also laying a 7¼-mile, 6-in. branch from the main line to a bulk station near Allentown, Pa. The spread is supervised by Lyle S. Dewitt.

The Midwestern spread under M. T. Wilhite which has recently finished three 26-in. loops totaling 43 miles for Panhandle Eastern Pipe Line Co. near Centralia, Mo., Glenarm, Ill., and Pleasant Hill, Ill., has been moved to the 79-mile section of the 22-in. Cushing-Chelsea, Okla., section of the Ozark System being built by Shell Pipe Line Corp. A field office for the spread has been established at Cleveland, Okla.

Work in New Jersey and Pennsylvania, subcontracted by Midwestern from Brown & Root, Inc., for Texas Eastern Transmission Corp., has been completed. This included removal of pipe in the Chester, Pa., and Linden, N. J., areas and the laying of 27 miles in the Philadelphia area.

Humble-Port Arthur Take-Up Work Is Half Completed

The removal of 250 miles of 6-in., 8-in. and 10-in. pipe between Humble and Port Arthur, Tex., has been more than half completed for Texas Pipe Line Co. by the contractor, Latex Construction Co. H. L. Leake, superintendent, has a field office at Liberty, Texas.

Construction of tank-farm piping for Texas Pipe Line Co.'s West Columbia, Tex., pump station is reported to be more than 90 per cent completed. The job is under J. B. Latham, superintendent for Latex.

Work has just begun for laying a 24-mile, 8-in. products line for Alamo Refining Co. from Sweeny to Freeport, Tex. F. A. Silar, superintendent for Latex in building this project, is working from headquarters at West Columbia, Tex.

All of the 70 miles of 24-in. loop

"Everything for the Pipeliner"
PIPE COATING and WRAPPING MACHINES
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OKLAHOMA CONTRACTING CO., Inc.

MERCANTILE BANK BLDG.
DALLAS 1, TEXAS

lines for Southern Natural Gas Co. in Alabama and Georgia have been completed by Latex under the supervision of W. H. Hayes, superintendent, with the exception of the Coosa River crossing which has been delayed by floods.

Panhandle Cleared to Pay Dividend in Hugoton Stock

Federal Judge Paul Leahy has denied Federal Power Commission an injunction against Panhandle Eastern Pipe Line Co. to stop payment of Panhandle stockholders a dividend of 810,000 shares of Hugoton Production Co. stock.

FPC has contended that Panhandle and Hugoton entered into an agreement whereby Panhandle transferred certain gas leases that had already been committed as justification for authority to construct natural-gas facilities, to Hugoton and that Hugoton plans to develop the acreage and negotiate sales to parties other than Panhandle. The commission also said that all of the officers and directors of Hugoton are identical with those of Panhandle, and that Panhandle was to pay Hugoton $675,000 in consideration of the issuance by Hugoton of the 810,000 shares.

Bids Taken for 269-Mile Columbia G. & E. Line

Bids have been received for the construction of a 269-mile, 24-in. gas line from Clendenin, W. Va., to Rockville, Md., by Atlantic Seaboard Corp. and Virginia Gas Transmission Co., subsidiaries of Columbia Gas & Electric Corp.

Work on the project will be under way in 1949. The terrain traversed by the line is largely rough mountainous country where the route crosses many steep ridges. Because of the difficulty in getting access to mountainous sections of the right-of-way some reconnaissance for contractor estimates has been done by helicopter. The highest point on the route is reported to have an elevation of 4,700 ft.

T. G. T. Will Build Radio Transmitter at Houston

Houston is to be included as the site for one of a chain of radio communication towers being built by Tennessee Gas Transmission Co. The system of radio towers and communications system will extend from the Mexican border to Clendenin, W. Va. The company had already located towers at Aqua Dulce, Victoria, East Bernard, Fostoria, and Jasper, all in Texas. Towers will also be built at

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Acid Resistance—High Pick-Up Factor—Heat Resistance—No Patching or Splicing—Moisture Resistance—High Porosity—these properties keep Owens-Corning Fiberglas Pipe Wrap the leader in its field of underground pipe protection. For consistent CORROSION CONTROL the first name is always Owens-Corning Fiberglas.

Look to Midwestern for all your aids in the fight against pipeline corrosion. Large warehouse stocks are at your disposal. Midwestern—a by-word in the pipeline industry meaning—SERVICE. Detailed information will be furnished you upon request.

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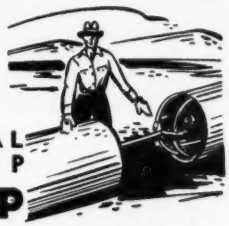
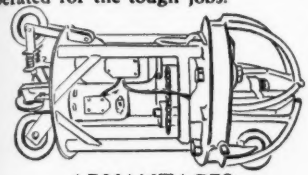


INTERNAL LINE-UP CLAMP

The electric model shown below is a rugged, heavy-duty clamp, electrically operated for the tough jobs.



ADVANTAGES:

For The Owners:
Better stringer bead; better finish weld; better pipe line.

For The Builder or Contractor:
Speed; stringer bead cut-out eliminated; economy; swabbing and alignment with one tool; less labor required.

Available for pipe sizes 12" through 36"
Rental or Outright Sale Basis

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CLEVELANDS
• MOBILE
• COMPACT
• RUGGED
• FAST

... are first choice for trenching Main Line, Gathering Lines, Distribution Lines and Stripping Pipe.

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Natchitoches, La., Greenville and Batesville, Miss., Portland and Libelsville, Tenn. Stations are already operating at Campbelsville, Winchester, and Ashland, Ky. and at Clendenin, W. Va.

Tennessee Gas has purchased a 28-acre tract near Houston and will erect a 300-ft. steel tower and a building for transmitter equipment. The equipment will be used for broadcasting company instructions to mobile equipment and to receive information from mobile sets. About 100 motor vehicles and four airplanes operated by the company are being equipped with radio telephone equipment at a cost of about $600 per unit.

Argentine Line Progresses South of Buenos Aires

The construction spread operated by Direccion General del Gas del Estado de Argentina is reported to be working in the vicinity of Medanos as it progresses steadily southward from Buenos Aires in laying the northern section of the Argentine Government's 1,100-mile, 10-in. line for transmitting natural gas from the Comodoro Rivadavia area.

After completing the 365-mile Buenos Aires-Bahia Blanca section on October 22, the spread proceeded to lay the Bahia Blanca-Rio Colorado section. The Coronel Pringles-Bahia Blanca section was completed in 45 days including 17 days for traversing the Pillahuinco and Ventana mountains.

Texas-New Mexico Will Lay West Texas Pipe Line

Texas-New Mexico Pipe Line Co. will construct approximately 26 miles of 7⅝-in. pipe line in Andrews County, Texas, paralleling its present 6-in. line from Shafter Lake Section to a point about 26 miles southwest of the station.

A contract for construction of the line has been awarded to Wright Construction Co., Lovington, N. M. Work on the project is scheduled to commence immediately.

Lone Star Line Completed

A new 40-mile Lone Star Gas Co. transmission pipe line connecting the Paris area of Texas with Winnsboro and Coke gas fields near Sulphur Springs, Tex., has been put into operation.

Officials of the company say the new line with a daily capacity of 20,000,000 cu. ft. is designed to afford additional gas supply for Paris and other towns in the vicinity. The line was started October 8 of this year.

WILLIAMSON PIGS "Tailor Made" for YOUR PIPE LINE

ALL PIGS ARE PROVIDED WITH THE EXCLUSIVE "JET ROTATION" FEATURE*

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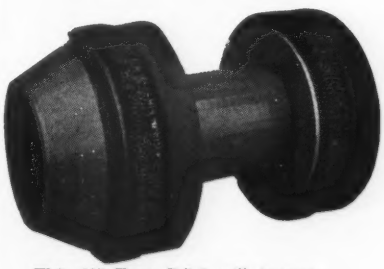
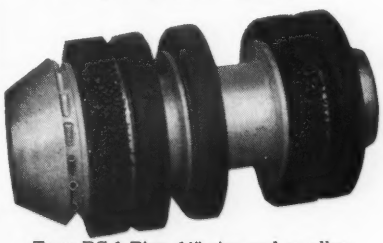
Each Pig Is Designed To Traverse Specified Valves and Fittings — SAFELY

FOR EXAMPLE:

This Type RC-1 Pig, 16" size and larger, is for the usual conditions of:
Conventional gate valves
Full diameter, 90° laterals
Field bends, min. radius 10 ft.



This 22" Type RC-5 will traverse
Through-conduit valves
Full diameter, 90° laterals
Factory ells, 1½ radius, 22½°



Type RC-1 Pigs, 14" size and smaller, must traverse
Various types of gate valves
Elongated side openings (laterals)
Small-angle sharp bends

*Patents pending

THE PIG WITH THE POKE CLEANS PIPE LINES

T. D. Williamson, Inc.
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THE TIGER BRAND SPECIALIST SAYS—
"If your wire
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AMERICAN
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rope takes a beating like this, you ought to check the application"

"The foreman on this job was blowing his top. He was already behind in production when this machine went down. He swore that the wire lines were no good.

"We took a look at the sheaves. They were badly worn. Then I asked him, 'When did you check those grooves?' Nobody on the job could remember when the sheaves had been regrooved.

"We got out a gage. Sure enough, that's where the trouble was. The grooves had worn down so that the proper size gage nowhere near bottomed. Now they're regrooving and I sold him on the idea of letting me check all his equipment. I'll bet we keep his business and his lines will give twice the service."

Are you sure you have the RIGHT wire rope for your job!

Are you convinced beyond a doubt that your rotary lines are operating at the lowest obtainable unit cost?

Are you sure that your equipment is contributing fully to long, safe line life?

If not, you should have a check-up by a TIGER BRAND Specialist—a thoroughly experienced field service engineer.

To show you how the proper application of wire lines can save you money, we have prepared a new booklet to help you check your own operating conditions.

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Gentlemen:

Please send me a copy of your booklet, "Valuable Facts about the use and care of Wire Rope."

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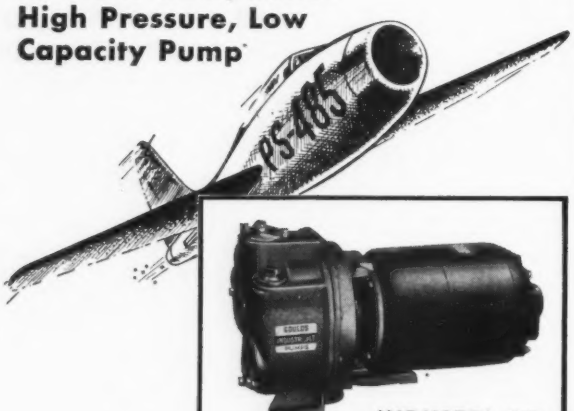
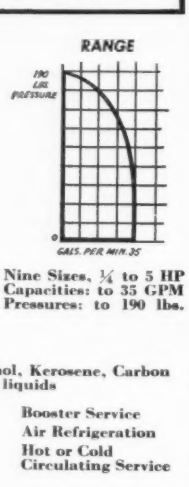
GOULDS USES JET PRINCIPLE

To make New, Better High Pressure, Low Capacity Pump



GOULD'S has combined a centrifugal and a jet or ejector type pump in one compact unit. This new pump gives you unique advantages in high pressure—low capacity applications.



Nine Sizes, ¼ to 5 HP
Capacities: to 35 GPM
Pressures: to 190 lbs.

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FOR HANDLING } Cold or Hot Water, Alcohol, Kerosene, Carbon Tetrachloride and similar liquids

General Water Supply	Air Conditioning	Booster Service
Condensation Return	Spraying	Air Refrigeration
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ADVANTAGES

IN PERFORMANCE

1. *Self Priming*—can't vapor lock. Once primed, always primed. The Industri-Jet automatically recovers prime even after suction is exposed to atmosphere.
2. *Built for continuous service.*
3. *Handles both wet and dry liquids.*
4. *Smooth, quiet operation—steady flow.*

IN COST

Initial cost is low—and lower still when you consider quality construction and the many operating advantages.

IN MAINTENANCE

1. *Freedom from wear—long life.* Industri-Jet uses the Jet principle for high pressure. There are no close running fits or clearances. The only moving part is the rotating impeller and shaft.
2. *Mechanical seal needs no attention.* Self-Adjusting for wear, requires no lubrication.
3. *Easy to inspect.* Entire pump can be disassembled without disturbing suction or discharge connections.

Write Goulds Pumps, Inc., Seneca Falls, N. Y., for complete information on this new pump. Ask for bulletin 630-A1.

GOULDS PUMPS, INC.
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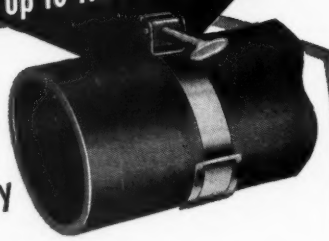
the PUMP FOR *the* JOB

This is a
MARMAN PATCHMASTER
It Stops Pipe Leaks up to 1100 P.S.I.



Quickly
Cheaply
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FEATURES: Stainless steel for strength, corrosion resistance, permanent repairs. • Hycar pad resistant to deterioration by hot or cold water, gas, oil, etc. • Can be used and re-used—outlasts pipe. • Easily and quickly installed by one person. • Forms naturally to pipe contour—no loose parts. • Adjustable—4 sizes for all pipe up to 4".

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THE OIL AND GAS JOURNAL
BOX 1260 **TULSA 1, OKLA.**

REFINING

Sinclair's Sand Springs Refinery to Be Shut Down

FOLLOWING a policy of discontinuing small refineries and serving its customers through products lines from a few large plants, Sinclair Refining Co. has announced that effective January 1, 1949, its Sand Springs Okla., plant would be closed.

The company has already closed refineries at Fort Worth; Kansas City, Kans., and Coffeyville, Kans., in accordance with plans announced July 1948. The Sand Springs refinery is the fourth and last of the plants Sinclair plans to discontinue. *(The Oil and Gas Journal, November 25, 1948, page 137).*

The area served by the Sand Springs plant will probably be supplied through the products pipe line from Sinclair's large refinery near Houston, although the products line is so constructed that products can be pumped either way. Thus the company could pump products to the Oklahoma area either from Houston or their plant in East Chicago, Ind.

Company officials said that the plants that have been closed are old and in most cases will be dismantled and sold with usable parts used elsewhere. The Sand Springs refinery, which has a capacity of 7,000 bbl. daily, was originally built by Pierce Oil Corp. and was purchased by Sinclair about 25 years ago. About 300 employes will be affected by the shutdown. In other cases, Sinclair employes have been offered the opportunity to transfer to other company locations.

Gov. Frank Carlson of Kansas has protested to Sinclair officials on the closing of plants at Coffeyville and Kansas City. *(For complete information on Sinclair's products line, see The Oil and Gas Journal, September 23, page 168, and July 15, 1948, page 49).*

Jefferson Combines Work In Austin, Tex., Plant

Jefferson Chemical Co., Inc., has announced that its research, process development, and pilot plant activities now being carried on in New York City and Port Arthur, Tex., will be consolidated in a new plant located just inside the north city limits of Austin, Tex., on the Austin-Dallas highway.

The plant is being purchased from Holland Page and plans for the immediate future call for remodeling the present buildings to make them suitable for chemical research activities. There is ample room for further expansion of facilities as the company expands its research activities.

Jefferson Chemical is jointly owned by The Texas Co. and American Cyanamid Co. The company operates as an independent organization. Its principal products are ethylene glycol, ethylene oxide, and ethylene dichloride, which are used in the manufacture of permanent-type antifreezes, synthetic rubber, detergents, and other chemicals. The company is also engaged in a broad research program with major emphasis directed toward the development of processes for the manufacture of intermediates and bulk chemicals from petroleum.

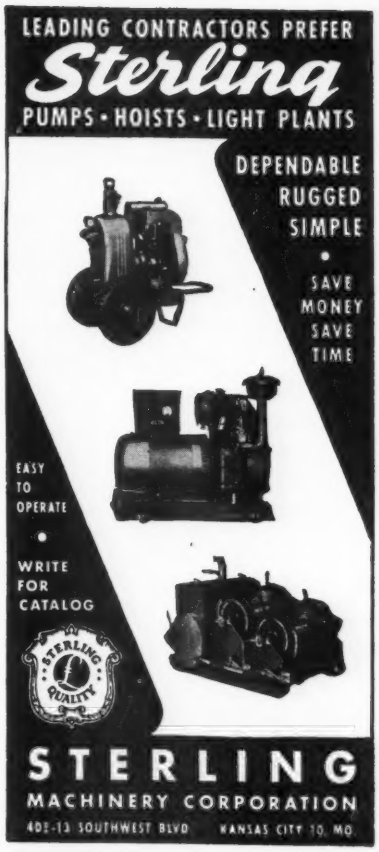
Esso Makes Synthetic Alcohol Commercially

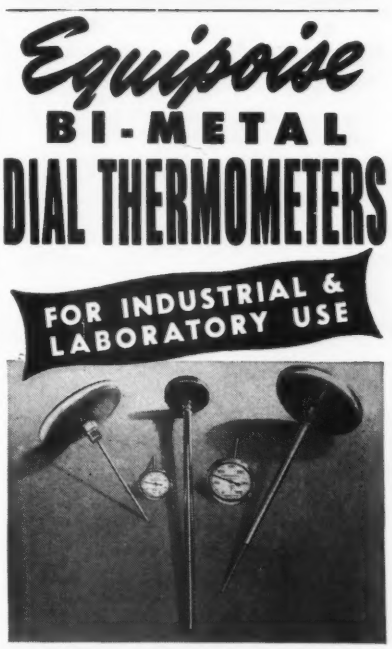
ESSO STANDARD OIL CO. has announced the first commercial production of synthetic alcohol by a new process which provides a large low-cost source of raw material in plastics manufacturing. *(For picture of plant see page 47, this issue.)*

Synthetic, isooctyl alcohol, is used in the production of plasticizers, a basic ingredient in compounding and forming plastics and giving flexibility and suppleness to the finished product. Full scale production of synthetic alcohol should relieve current shortages of plasticizers which are used in such products as fabrics for upholstery and curtains, phonograph records, food packaging, floor coverings, paints and varnishes, and in rubber compounding.

The new process developed by Esso Standard at its Baton Rouge, La., laboratories involves the reaction of a selected gasoline fraction with hydrogen and carbon monoxide gases in the presence of a special catalyst at pressure up to 3,000 psi. Crude alcohol is recovered from the high-pressure operation and purified to yield finished isooctyl alcohol.

Esso Standard claims to be the first company to achieve commercial production of chemicals by this method, an adaptation of the Oxo process. A continuous method was devised at the Baton Rouge laboratories and a small high-pressure plant was converted for the operation of the process. The

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EQUIPOISE precision-built temperature indicators are available in ranges, sizes and mountings that meet every industrial and laboratory requirement. Included are many standard models within the range of —90° and 1000° F. Any standard range on order.
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Sour Gas?

To remove heavy sulphur from natural gas, specify Iron Sponge. This concentrated purification material operates efficiently at high pressures, has high capacity and activity. Long periods between foulings, fast come-back after fouling, low initial cost and maintenance—these are the important features that have made Iron Sponge the choice of the gas industry for the past 73 years. Whatever your purification problem—consult Connelly today. We have the experience and facilities to meet your needs and there's no obligation.

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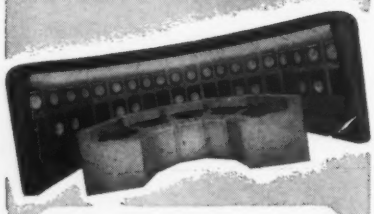

. . . like the admirable Falstrom CONTROL CENTER shown here! This is indeed the last word in modern instrumentation—suited to the finest and newest petroleum cracking plants or power installations.

. . . yes, nothing but an actual visit to this western control station can convey the sense of its sweeping beauty and painstaking construction.

. . . but we have tried to picture it for you in our Bulletin 126—write for it.

FALSTROM COMPANY

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company is now considering the conversion of a larger plant, formerly used for the hydrogenation of oil, to increase production of isooctyl alcohol.

Globe Will Install New Cracking Unit

Installation of a 6,000-bbl. per day catalytic cracking unit has been authorized by Globe Oil & Refining Co. for expanding its facilities at Lemont, Ill. Completion of the new unit is expected by January 1, 1950. Engineering on the plant has been contracted to Universal Oil Products Co.

Present topping facilities of the Lemont refinery have a capacity of slightly less than 32,000 bbl. daily. A thermal cracking plant is also included in the facilities at the company's refinery.

Shallow Water Refining To Construct New Unit

Construction of a 1,250-bbl. per day Perco refining unit, recently authorized by Shallow Water Refining Co. for its refinery at Shallow Water, Kans., is scheduled for completion in the third quarter of 1949.

Processing facilities at the refinery presently consist of a 2,500-bbl. per day topping plant and a thermal cracker rated at 550 bbl. daily throughput. The refinery at Shallow Water is the only processing facility operated by the company.

Koch Engineering Co., Wichita, Kans., is the contractor on engineering and construction of the unit.

A. C. S. Announces New Petroleum Chemistry Award

A prize of $1,000 for outstanding achievement in petroleum chemistry was recently announced by the American Chemical Society, which will administer the award.

The new award will be known as the Precision Scientific Co. Award in Petroleum Chemistry, named after the company founding it.

Its purpose will be to "recognize, encourage, and stimulate outstanding research achievements in the field of petroleum chemistry in the United States and Canada."

A nominee must be a citizen of the United States or Canada, who shall not have passed his fortieth birthday on April 30 of the year in which the award is to be presented. He must have accomplished outstanding research either in petroleum chemistry itself or in some phase of fundamental science that contributes directly and materially to the knowledge of petroleum and its products.

Nomination for the prize, which will be awarded for the first time in 1949, should be submitted by January 1, 1949, to Alden H. Emery, executive secretary of the American Chemical Society, 1155 16th Street, N.W., Washington 6, D. C.

Gulf Improves Insecticide

Gulf Oil Corp. has announced the development of a new type insecticide using the powerful and recently developed insecticidal chemical, chlordane, a petroleum derivitive. Since chlordane is not a repellent, insects do not hesitate to crawl on its invisible killing film. Two "drive-out" and paralyzing agents, pyrethrin and organic thiocyanates are added to the Gulf product which will be marketed as Gulfspray Roach and Ant Killer.

Panhandle May Add Plant

Engineers of Panhandle Producing & Refining Co. are studying the feasibility of equipping the company's Wichita Falls, Tex., refinery with a Fluid catalytic cracking plant.

THE HEART OF ANY PLANT . . .

. . . IS ITS BATTERY OF HEATERS

FOR EVERY PROCESS THERE IS A BORN UPFLO HEATER

BORN ENGINEERING CO.
TULSA, OKLAHOMA

INDUSTRIAL OIL AND GAS BURNING EQUIPMENT

AIROIL

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Our Service Does NOT End At Your Doorstep

You order your chemicals . . . and we deliver them. *BUT* General Chemical's service does not stop at your doorstep. Our Technical Service Organization, for example, has been created solely to help General Chemical customers solve their problems involving the handling, storing and use of chemicals.

This is not a group of "ivory tower" consultants, but a staff of practical men who will work with you confidentially—in your own plant if necessary—until your questions are answered. They may not know everything about your business, but they do know our chemicals and can help you get the best use out of them in your operations.

That is why General's Technical Servicemen so frequently offer suggestions and ideas that point the way to new efficiencies and economies in production and research operations.

Remember—General's Technical Service staff is yours to utilize. Just advise the nearest General Chemical office when you need such assistance.

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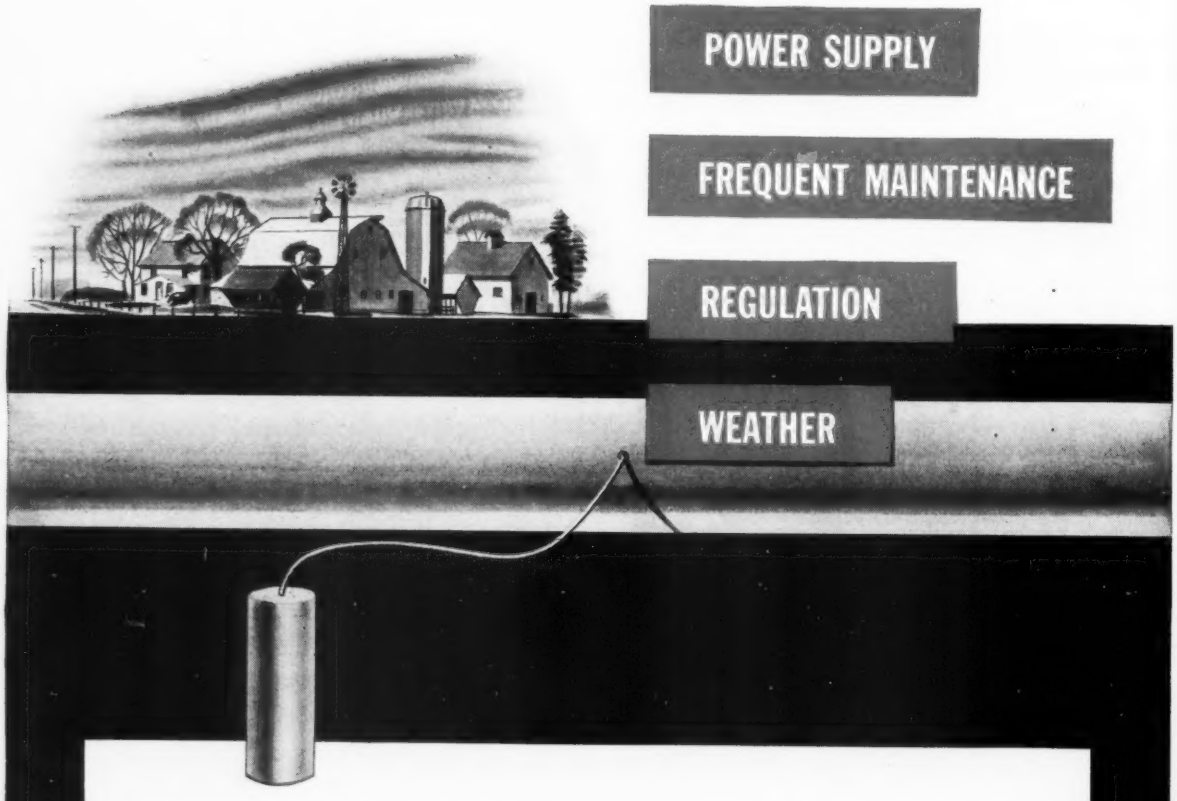

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NATURAL GAS

September Revenues Up 19.3 Per Cent Over Last Year

Operating revenues of natural-gas companies reporting to the Federal Power Commission amounted to $56,224,864 in September, an increase of 19.3 per cent above the same month a year ago.

For the 12-month period ended September 30, 1948, gas operating revenues aggregated $814,323,164, a gain of 13.2 per cent over the total reported for the previous 12-month period. Net income for the period was $153,049,035, an increase of 4.6 per cent over the same period a year ago.

Gas-utility operating income for September was up 23.4 per cent over the same month a year ago, showing a total of $5,635,245. Net income for September this year amounted to $7,115,930 compared to $5,682,020 reported in September 1947.

Gas sales to ultimate consumers in September 1948 were up 13.9 per cent over the comparable period a year ago. Sales to residential consumers increased 9.5 per cent and to commercial and industrial consumers 8.6 per cent and 13.3 per cent, respectively. Revenues from sales to ultimate consumers increased 12.7 per cent and amounted to $28,197,728. Revenues from residential and commercial consumers were up 8.8 per cent and 9.2 per cent, respectively. Revenues from industrial consumers were up 15.5 per cent.

Third-Quarter Natural-Gas Sales Increase 11 Per Cent

Sales of natural gas by the gas-utility industry during the third quarter for 1948 increased 11.2 per cent, from 521,000,000 M.c.f. to 579,000,000 M.c.f., according to a report by the American Gas Association. Natural-gas revenues for the quarter totaled about $171,000,000, a gain of 13.7 per cent over the same period a year ago.

Natural-gas customers totaled 11,400,000 at the end of the third quarter, a gain of 12.9 per cent over the comparable period for 1947.

For the 12-month period ended September 30, 1948, total natural-gas revenues for the gas-utility industry was $940,000,000 as compared to $815,000,000 for the previous 12-month period—an increase of 15.3 per cent. Total revenue for all gas (manufactured, mixed, and natural) sales during the 12-month period was $1,500,000,000, an increase of 11.7 per cent over the previous 12-month period.

Because of the rate increase in manufactured gas, revenues in the third quarter this year increased 7.4 per cent over similar period last year, although sales declined this year by 1.1 per cent. The decline in sales of manufactured-gas companies to distribution of natural gas.

Cities Service Accounting Adjustments Approved

Cities Service Oil Co.'s proposed accounting adjustments eliminating from its gas-plant adjustments the amount of $1,373,913.08 representing cost of certain leaseholds and profits on engineering fees paid to affiliates, have been approved by Federal Power Commission.

In 1947 the commission approved accounting adjustments proposed by Cities Service disposing of $16,766,336, representing excess over original cost of the company's gas plant. At that time FPC stated that the amounts classified as gas-plant adjustments, were not fully in accord with adjustments proposed by the commission's staff and directed Cities Service to submit proposals regarding classification and disposition of the additional amounts. This latest proposal and approval are the results of the 1947 directive.

Texas Eastern Authorized To Increase Deliveries

The Federal Power Commission has authorized Texas Eastern Transmission Corp.'s proposed supplemental rate schedule, which provides for a change in service by increasing deliveries of natural gas to East Ohio Gas Co., New York State Natural Gas Corp., and Peoples Natural Gas Co. (Consolidated Companies) by 75,000,000 cu. ft. per day.

However, the commission's order specifies that no sales or deliveries shall be made by Texas Eastern to the Consolidated Companies until Texas Eastern's sustained deliveries exceed 433,000,000 cu. ft. daily.

Texas Eastern's proposed construction, which received temporary FPC authorization May 28, 1948, would increase delivery capacity of the company's lines by 75,000,000 cu. ft. daily.

National's Hearing Is Set With Probable Suppliers

An application filed with the Federal Power Commission by National Gas & Oil Corp., Newark, Ohio, requesting an FPC order directing Texas Eastern Transmission Corp. to establish physical connection of its natural-gas facilities with National's facilities and directing Texas Eastern or Texas Gas Transmission Corp., or both to sell and deliver gas to National, has been consolidated with a hearing currently in progress involving applications of Texas Gas and Texas Eastern.

Texas Eastern is requesting FPC authorization to construct facilities to increase the delivery capacity of its lines from the vicinity of Middletown, Ohio, to Windridge, Pa., and also facilities to increase delivery capacity of the Little Inch line south of Lisbon, La. Texas Gas is seeking authorization to construct and operate a Texas-Middletown, Ohio, pipe line.

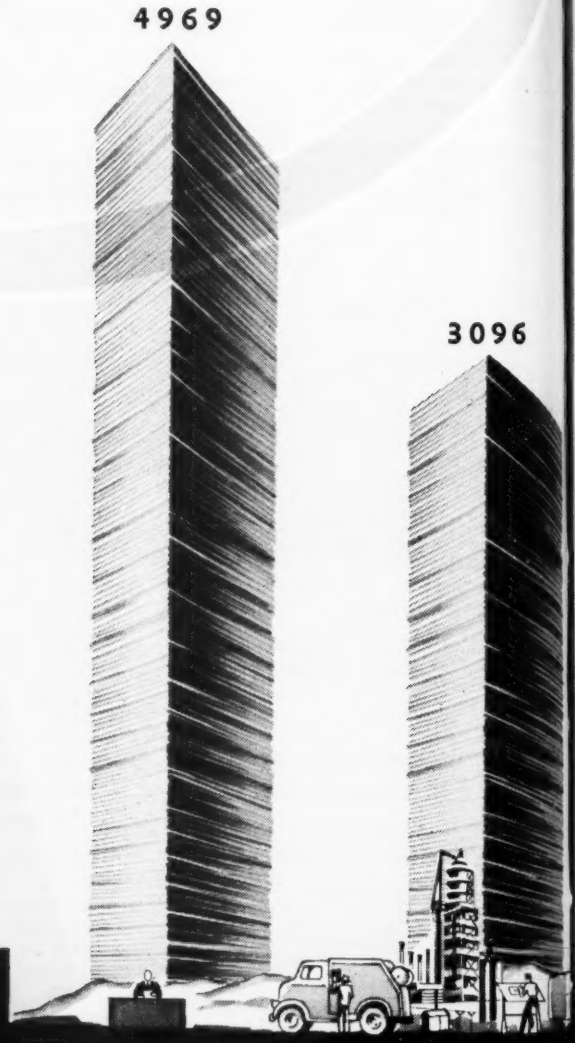
Northern Natural's Extra Gas Capacity Is Allocated

The Federal Power Commission has issued an order establishing revised rate schedule provisions for the apportionment of gas available to Northern Natural Gas Co. as a result of construction which increases the company's pipe-line capacity above 390,000,000 cu. ft. daily. The provision became effective as of November 27, 1948.

On October 27, 1948, Northern Natural had increased its pipe-line capacity from 390,000,000 cu. ft. daily to 425,000,000 cu. ft. and after allowing for gas needed in its operations, is now in a position to apportion approximately an additional 27,000,000 cu. ft. of natural gas among its customers in accordance with the provisions established by the commission order.

Revised provisions apportion gas to each utility customer in three steps. First, each utility customer is assigned, for residential non-space-heating purposes, a volume of gas equal to 10 cu. ft. of demand per residential customer for each year since the previous allocation. Second, a specific volume of gas for non-space-heating requirements of residential and small-volume, commercial and industrial consumers will be assigned for communities changing over to straight natural gas or for communities which FPC has heretofore certificated or may hereafter certificate for natural-gas service. Third, of the volume of allotable gas remaining, 50 per cent is to be allocated on the basis of the number of residential consumers of each community without gas house-heating and 50 per cent on the basis of contract demands on September 1, 1948.

Selective CIRCULATION



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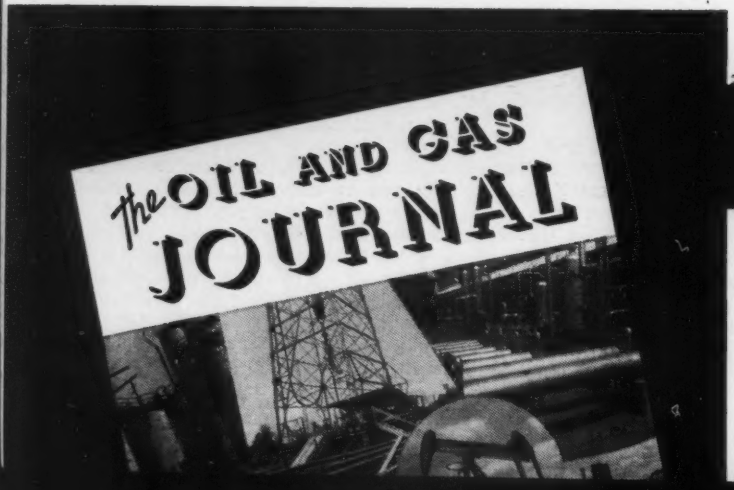

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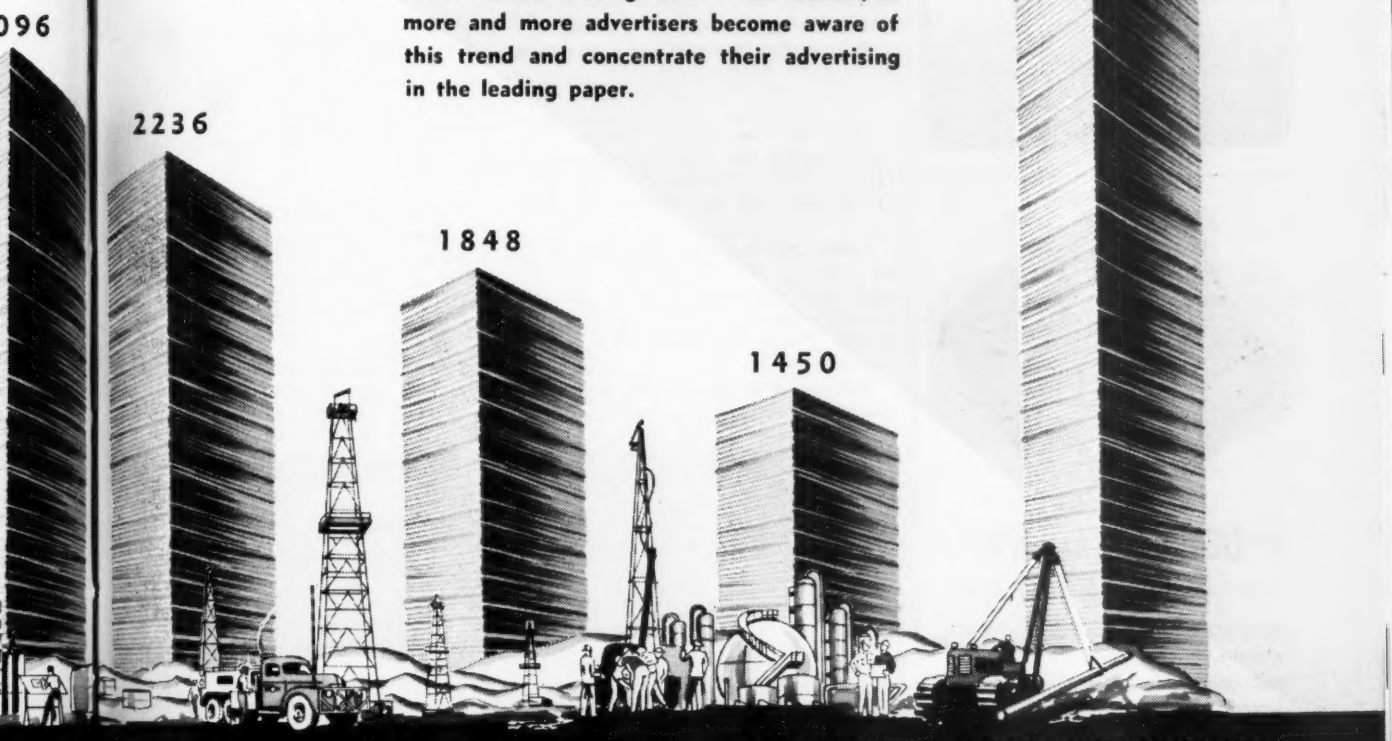

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Among the Drilling Contractors

Safety Clinic to Feature Superintendent's Role

The fourth annual drilling industry safety clinic, which will be held May 24-25, Baker Hotel, Dallas, Tex., and sponsored by the American Association of Oilwell Drilling Contractors, will place special emphasis on the part a drilling superintendent plays in the over-all safety experience of a drilling company. A second feature of the program will pertain to transportation safety problems of drilling companies operating their own truck units.

The safety and insurance committee meeting in Houston in connection with the eighth annual meeting recently made recommendations for a basic work program for 1949.

Olds Oil Co., Mount Carmel, Ill., has contract for Gass & O'Leary 1 Grover Robb, 12-2s-9w, Gibson County, Indiana, and was rigging up tools.

Lewis Drilling Co. is making hole at 1 Knopp, NE SE NE 32-19-11, ½ mile east of Ellinwood in Barton County, Kansas, and ¼ mile south of the North Ellinwood pool.

Helmerich & Payne, Inc., has contract for California Co. 1 J. C. Brannan in NW NE SE 30-7s-3e, wildcat in Love County, Oklahoma. Surface pipe has been set and total depth is 1,806 ft.

Jayhawk Drilling Co. has begun operations at Vickers Petroleum Co. 1 Hilgers, NE NE NE 6-10-18, 3 miles southwest of the Paradise Creek pool in southern Rooks County, Kansas.

Clark Drilling Co. has contract for P. P. Langford, Jr., 1 Powell, wildcat in southeast of the R. Storey Survey 148, 1½ miles northeast of the Fain & McGaha's King production in Archer County, Texas. Contract is for 4,000 ft.

C & L Drilling Co., Ada., Okla., has contract for Wilcox sand, expected around 3,000 ft., for Garr-Woolley Oil Co. 1 Mercer, wildcat in SW SW NE 20-3n-4e, south of Vanoss in southwestern Pontotoc County, Oklahoma.

B & R Drilling Co. was rigging up at 1 Kanady, NE cor. of Lot 9, 6-28-8e, 3 miles northeast of the Brandt-Sensenbaugh pool and 4 miles southeast of the Keighley pool in Butler County, Kansas.

Glenn Gillespie & Sons, Cushing, Okla., has contract and is moving in tools on the Mazda Oil Corp. 1 Allen

Crew of Creekmore Drilling Co., on location at the Amerada Petroleum Corp. 4 Hansen, in Sholem Alechum field, Stephens County, Oklahoma. The men are Elmer Cousins, Robert H. Keith, C. J. Moore, Henry Hudson, and J. F. Kennedy, driller

Merriman in SE NE NW 26-22n-2w, west of the Fordee field in Noble County, Oklahoma.

Smulcer Drilling Co. has staked the 1 Blagg in Block 28 of Cowherd Brothers subdivision of the William Graves Survey A-81, in East K.M.A. field, for a 4,300-ft. test in Wichita County, Texas.

Helmerich & Payne, Inc., has contract for 1-C W. T. Music in C SE NW 35-10n-21w, south of the Elk City field in Beckham County, Oklahoma. Drilling was at 1,425 ft.

Buaas Drilling Co., R. W. Sherman, and Signal Oil & Gas Co. have completed the Newhall 3-1 west of Newhall, Calif., at a total depth of 5,846 ft. for an estimated 500-700 bbl. of 40°-gravity oil. Location for a second well has been staked one location north and west of the discovery.

Virginia Drilling Co. has started operations at the 1 Wells, SE SE SW 32-22s-11w, ½ mile southeast of the Richardson pool in Stafford County, Kansas.

Smiley & Little Drilling Co. has contract for A. Ben Chadwell 1 Stewart, wildcat in NE NE SW 15-29n-4e, west of Hardy and just south of the Kansas line in northeastern Kay County, Oklahoma. Contract depth is 3,700 ft.

R. W. Porter, contractor, is drilling at 600 ft. for a Berea grit test for Chesterhill Oil & Gas Co. in Chester Township, Meigs County, Ohio.

Falcon Seaboard Drilling Co. has started its 1 Wolff, in SE NW SW 34-24n-3w in Garfield County, Oklahoma. It will be a 5,000-ft. test.

Talbert Drilling Co., Breckenridge, Tex., has contract to drill the Homer Easterwood et al 2 Herman Giesecke, 330 ft. from south and west lines of Lot 121, of the Giesecke third subdivision, and 11,120 ft. south and 5,365 ft. west of the northeast corner of the James Hughes Survey 227 in southeast Runnels County, Texas. The test is to be a 3,800-ft. wildcat to explore the Ellenburger.

Rocky Mountain Drilling Co. was drilling below 3,200 ft. on the Humble Oil & Refining Co. and British-American Oil Producing Co. wildcat near Castaic in 1-4n-17w, Los Angeles County, California.

Zephyr Drilling Co. 1 State Land B in SE NW NE 36-19n-1e, southwest of Stillwater in Payne County, Oklahoma, was reported dry and abandoned in second Wilcox zone at 4,927-32 ft.

Mealy-Wolfe Drilling Co. 3 Blumer in NW SW SE 28-18n-2e, Payne County, Oklahoma, was rigging up rotary.

Summit Drilling Co. 1 Swartz in NW NW SW 8-20n-1e, southeast of Perry, Okla., in Noble County, was rigging up rotary after spudding with machine.

Norman Smith, who has contract on the Earl Sadler et al 1 Gaddy in NW NW SE 21-10n-2e, north of the Shawnee Lake area of Pottawatomie County, Oklahoma, had reached a total depth of 6,060 ft. Testing was to be resumed and casing set.

Loffland Brothers Co. was nearing a depth of 5,000 ft. on Humble Oil & Refining Co. 1 DiGiorgio in the Richgrove area of Tulare County, California.

L. E. Reames Drilling Co. has spudded the 3-B Carl Greenwood in NE NW SE 5-25n-14e, for a 1,100-ft. test in Washington County, Oklahoma.

Sun Drilling Co. 4 Higgins 20, in SW SE SW 16-2s-2w, is starting for a 2,500-ft. test in Carter County, Oklahoma.

Smith Brothers Drilling Co. was clearing location for 1 Stanley in NW NW SW 26-8n-2e in Pottawatomie County, Oklahoma, outpost to the Tribbey pool.

Glasscock Drilling Co. 3 Edmonds estate in SE 16-20n-5w in Clairborne Parish, Louisiana, in the Lisbon field, was completed for 744 bbl. of oil per day.

R. L. Bauman, drilling contractor completed the Max Pray et al 1 J. F. Martin in NW NW NE 22-2n-2w, in western Garvin County, Oklahoma, at a total depth of 6,830 ft. The new well apparently has opened a new and deeper sand zone on the west flank of the south end of the Northeast Elmore field.

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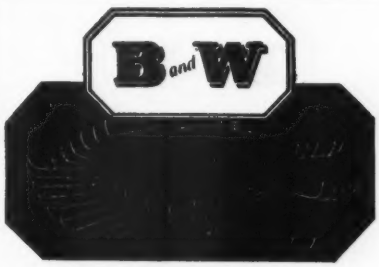

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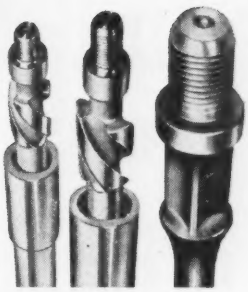

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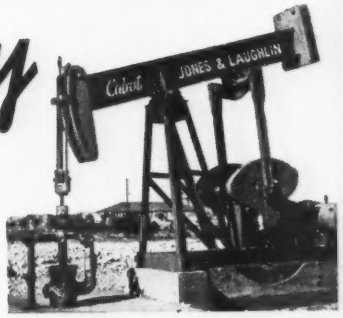

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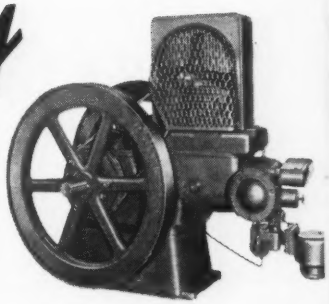

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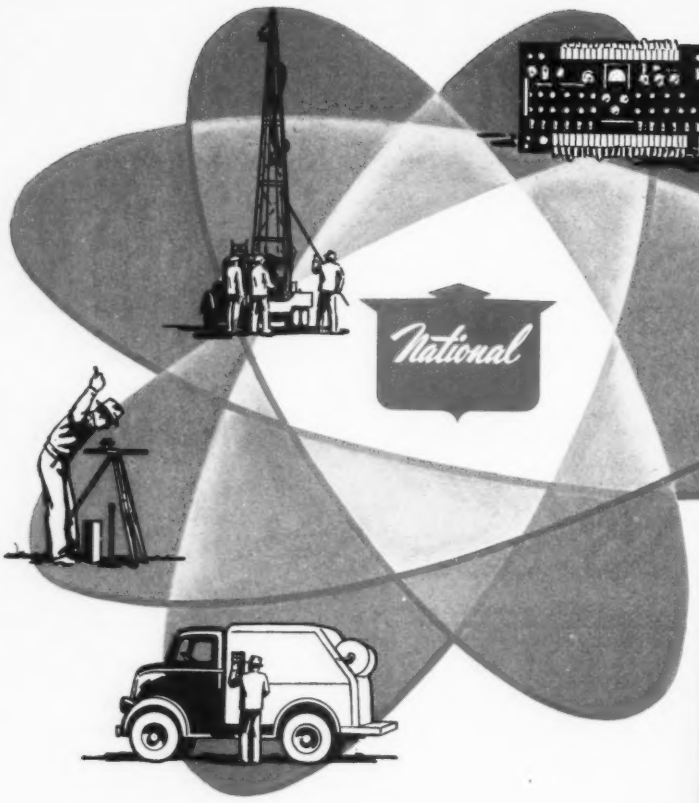

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Exploration and Drilling

Southwest Colorado Strike Booms San Juan Basin

THE San Juan basin area got a big boost last week, when the Dove Creek structure, in southwest Colorado, but still on the northwest rim of the basin, yielded a promising gas-condensate producer. The successful test is Byrd-Frost, Inc., and Western Natural Gas Co. 1 Driscoll, CNL NE NW 3-38n-19w, Montezuma County, Colorado, near the Utah line.

On a test through separators, during the first hour it flowed 30 bbl. of 64°-gravity condensate, and 20 bbl. during the second hour. It was then shut in to prepare for further testing. Previously the well had flowed gas and condensate, estimated by company officials at 15,000,000 cu. ft. and 200 to 500 bbl. daily.

This well was drilled to a total depth of 8,286 ft., in the Mississippian. Tops reported are: Hermosa (Pennsylvanian) 4.490 ft., Paradox 5,910-7,820 ft., Molas 8,010 ft., Mississippian 8,143 ft. A 7-in. production string was set at 5,978 ft., and the interval at 5,910-34 ft., (upper part of the Paradox Salt of the Pennsylvanian) perforated with 96 shots.

This is the first gas and first condensate discovery for Colorado in 1948. It is located about 25 miles northwest of the town of Cortez. It lies about 55 miles northwest of the Barker Creek gas field, which straddles the New Mexico-Colorado line. It is also about the same distance northeast of the recent strike by the same operators at Boundary Butte, in southeastern Utah. *(See The Oil and Gas Journal, November 4, 1948, p. 133).*

The new strike will add fuel to an interest in the San Juan and Colorado Salt basins that has been growing steadily for more than 2 years. *(See The Oil and Gas Journal, October 26, 1946, p. 151, and July 12, 1947, p. 117).* Durango, Colo., and Farmington, N. M., now have district offices and headquarters for several major companies and independent operators.

There was a time when a gas discovery in this remote area would have attracted no attention, because no one could see any market. Now things are different. Barker Creek has substantial proven gas reserves; the new strike, only 55 miles northwest, may add another sizable chunk of gas reserve; and Boundary Butte, in Utah (about 60 miles west and a little north of Barker Creek), while now producing shallow oil, can be rated semiproven for deeper gas, on the basis of previous wildcats drilled there.

A 26-in. gas pipe line from Barker Creek to California has been planned, and is only a matter of time and getting steel. This line *(see The Oil and Gas Journal, July 8, 1948, p. 109)* will tie in with a 34-in. gas line from Needles, Calif., to San Francisco. Construction work on the 34-in. is slated to begin about the middle of next year.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTHWEST TEXAS.—Kirkwood & Morgan, Inc., and Placid Oil Co. 1 Louis Eisenhauer, wildcat test in Atascosa County, approximately 8 miles north of the Charlotte field, stuck drill pipe when drilling at 5,180 ft.; while trying to loosen the pipe the well blew out and started making oil and gas while blowing wild.

SOUTH LOUISIANA.—In the Gulf of Mexico, 8 miles offshore Plaquemines Parish, and 12 miles south of Bastian Bay production, Humble Oil & Refining Co. 1 Pelican Island State Lease, Account 1, Block 30, has cemented a string of 5½-in. casing and is waiting on cement to set. Oil shows have been reported at 2,152-85 ft. just above the cap of the salt dome. Salt was topped at 2,983 ft. Total depth of hole is 7,500 ft., with 5½-in. casing cemented on bottom.

ROCKY MOUNTAIN AREA.—On tests of the Dove Creek discovery well, Montezuma County, Colorado, Byrd-Frost, Inc., and Western Natural Gas Co. recovered 34 bbl. of condensate the first hour with 5,000,000 cu. ft. of gas daily through choke in the Paradox formation. Casing has been run on the Pure Oil Co. Mesa Verde discovery at West Poison Spider, Wyoming. General Petroleum Corp. has completed a gas discovery well in Routt County, Colorado. Stanolind is testing its deep test at Enos Creek, Wyoming, and the well is pumping at the rate of 200 bbl. of oil daily from the Tensleep.

WEST TEXAS.—Magnolia Petroleum Co.'s 1-A TXL, North Upton County wildcat, had 125 ft. of pay indicated in the Ellenburger and is rated as a discovery by many observers. A second well in the Bronte field of Coke County had good flowing production and has attracted much attention to the area. The new well, east of Bronte, flowed 75 bbl. of oil in 30 minutes, and observers have rated it, potentially, as Coke County's largest well. Superior and Atlantic 1-A-11 University, 2 miles southwest of Big Lake, has indicated discovery production in the Devonian. A drill-stem test from 9,240-95 ft. recovered 250 ft. of clean oil, oil-cut mud, and no water.

TEXAS GULF COAST

Victoria County Gets New Gas Discovery

HOUSTON.—A new gas discovery for Victoria County, Woodley Petroleum Co. 1 George A. Musselman, gaged an estimated 3,000,000 cu. ft. of gas per day on open flow through perforations at 2,256-67 ft., tubing pressure 900 psi., and casing pressure 925 psi. on the test. Well is now shut in for potential gage. Total depth is 5,502 ft., and 5½-in. pipe was set to 2,400 ft. for the completion. This well is located in W. W. Nichols Survey, 6 miles northwest of Inez, in eastern Victoria County.

Potential gage has been run at Magnolia Petroleum Co. 1 Maxine Means, new gas-condensate discovery in Live Oak County, approximately 7 miles south of Simmons City and 3½ miles east of the San Caja gas-condensate field. The well made an open flow potential of 5,000,000 cu. ft. of gas per day with shut-in pressure of 4,055 psi. Completion is through perforations at 8,820-25 ft. No gage of condensate was announced, but on preliminary test at this level, the well flowed 31.9 bbl. of 51.5°-gravity condensate in 12½ hours through a ¼-in. choke with gas ratio of 36,700, and 1,949 psi. working pressure. This well is located in Section 90, Simmons Farm Tracts, ACH&B Survey 157, 7½ miles southwest of the West Kittie field and 3 miles south of the Clayton field, a recent discovery.

Continental Oil Co. 2 Gena Heard, northeast extension to South Weesatche field in Goliad County, has been gaged at open flow of 13,500,000 cu. ft. of gas per day plus 71°-gravity condensate and no water, with gas ratio of 90,400. Tubing pressure was 1,892 psi. on the 3/16-in. choke, and the flow was 17 bbl. of condensate per day through perforations at 5,080-90 ft., in the discovery Yegua sand.

Herman Brown 1 Elizabeth Crum, wildcat test ⅝ mile northeast of the Bloomington field, Victoria County, is preparing to perforate for production test after setting 5½-in. casing to 4,737 ft. On drill-stem test made previously at 4,641-49 ft., the recovery was 150 ft. of oil and 90 ft. of oil-cut mud with no water in 15 minutes through ¼-in. chokes top and bottom, 350 psi. working pressure. This test is in SA&MG Survey 7. 1⅝ miles northeast of Bloomington townsite.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Liberty County: Discovery oil well, South Dayton—Gulf Oil Corp. 1 Sidney A. Smith, Wm. D. Smith Sur., 1 mi. off S flank of South Liberty dome, TD 9,936 ft., top sand 8,562 ft., perf. 8,562-8,600 ft., 254 bbl. of 38.9°-gravity oil per day through 9/64-in. choke, TP 1,375 psi., GOR 695.

Live Oak County: New gas discovery—Magnolia Petroleum Co. 1 Maxine Means, Simmons Farm Tracts, ACH&B Sur. 157, 7 mi. S of Simmons City, 3½ mi. E of San Caja field, 7½ mi. SW of West Kittie field, 3 mi. S of Clayton discovery, TD 9,022 ft., top pay 8,820 ft., perforations 8,820-25 ft., 5,000,000 cu. ft. gas per day on open flow, GOR 36,000, shut-in pressure 4,055 psi.

Wharton County: New pay, Egypt (deep) field—Claud B. Hamill 2 F. B. & Donald Duncan, Alexander Edgar League, TD 7,809 ft., top sand 7,160 ft., perf. 7,160-64 ft., 38 bbl. of 53.9°-gravity condensate and 1,140,000 cu. ft. of gas per day through ¼-in. choke, GOR 30,000, TP 2,200 psi., shut-in pressure 2,715 psi.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Austin County: Dixie Wright 1 Rudolph Kubicek, Geo. Sealy Sur., West Wallis area, 4 mi. SE of Orange Hill, dry, TD 10,010 ft.

Brazoria County: Teten & Pratt 1 St. Marys Orphanage, Lav Nav Co. Sur., 1½ mi. SE of Juliff, 1 mi. NW of Sandy Point, dry, TD 9,000 ft.

Hardin County: Hawkins & Graham 1 Kirby Lbr. Co. et al, Hardin County School Land Sur. 268, 1 mi. off NE flank of Batson dome production, dry, TD 8,200 ft.

Harris County: Placid Oil Co. 1 Elsie & Helen Bauer, M. Woods Sur., ¾ mi. N of Satsuma townsite, 2 mi. NW of Fairbanks production, dry, TD 7,825 ft.

Lavaca County: Wesley W. West et al 2 Edward A. Sibley, Wm. Blundell Sur., 4½ mi. SE of Hope, dry, TD 5,518 ft.

Refugio County: P. R. Rutherford et al 1 Ida Adams, John Scott Sur., 5 mi. N of Refugio townsite, dry, TD 7,504 ft.

San Jacinto County: Woodley-Jordan-Kirby 1 Gertrude H. Cummings et al, T. Simpson Sur. A-49, ¼ mi. S of Urbana townsite, 5 mi. SW of Livingston field, dry, TD 7,503 ft.

Wharton County: Hankamer Inv. Co. 1 W. P. Gann, E. C. Ogden Sec. 40, 5 mi. SE of El Campo, dry, TD 7,012 ft.

Wesley W. West 1 Blue Creek Ranch, John Crownover Sur., 15 mi. S of Pierce townsite, dry, TD 7,500 ft.

SOUTH LOUISIANA

Beauregard Parish Test Flows 194 Bbl. Per Day

NEW ORLEANS.—The Atlantic Refining Co. 1 Kirby Lumber Co., oil discovery in western Beuregard Parish, reported an initial flow gage of 194 bbl. of oil per day through an 8/64-in. choke, flowing pressure on tubing 590 psi., casing pressure 600 psi. with gas-oil ratio 311. Hole was drilled to a total depth of 9,806 ft., with 5½-in. casing cemented to 9,412 ft. Production is through perforations at 9,324-9,330 ft. This discovery is located in Section 17-5s-12w, approximately 4½ miles east of the Texas-Louisiana state line, being 3½ miles west of Bivens oil production.

A wildcat gas-condensate well is being brought in in the Fordoche area of southwest Pointe Coupee Parish, at The Texas Co. 1 Joseph Oscar Long et al, 29-6s-8e, 1 mile northeast of Lottie townsite. This well tested gas and condensate through perforations at 8,990-9,004 ft. Total depth is 10,280 ft., with 7-in. casing at 9,795 ft.

Sun Oil Co. and Sohio Petroleum Co. 2 Lapleau Estate, a wildcat in the Midland area of Acadia Parish, 49-10s-2w, was drilled to a total depth of 10,863 ft., and blew out of control, flowing gas and water. Drill pipe became stuck on the bottom, and operators attempted to run a 2⅜-in. drill pipe to put mud into the hole and bleed off the high pressure. Pressure had been recorded as high as 5,500 psi. A small drill stem was run to around 2,650 ft. and well started blowing between the 4½-in. pipe and the 2⅜-in. pipe. Estimated flow through a ⅛-in. choke was 67 bbl. of 42.9°-gravity condensate per day with maximum flowing pressure at 5,200 psi. The pressure dropped to 4,000 psi. on 10/64-in. choke, and flowed mud, salt water, sand, condensate and gas. The pressures remain high at present and test is flowing approximately 46 per cent salt water through a 15/64-in. choke along with the flow of gas and condensate.

Stanolind Oil & Gas Co. 9 South Jennings Unit, a deep north outpost test at South Jennings field in Jefferson Davis Parish, on a drill-stem test through perforations at 9,636-46 ft., using ⅛-in. top and ¼-in. bottom choke, developed 4,400 psi. top pressure and flowed gas with a spray of condensate. Drill stem was pulled and operators are running tubing for completion. Total depth is 11,270 ft. with 9⅝-in. cemented at 9,780 ft.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Terrebonne Parish: New oil sand, Four Isle Dome—The Superior Oil Co. 1-19 LLE-State Unit 19, 24-21s-16e, TD 13,230 ft., top sand 12,210 ft., perf. 12,210-220 ft., 294 bbl. of 38°-gravity oil per day through 9/64-in. choke, GOR 1,170, TP 2,400 psi.

Vermilion Parish: New gas-condensate pool—Superior Oil Co. of California A-2 Gulf of Mexico-State, 19 mi. offshore and 22 mi. S of Fresh Water Bayou field, in Gulf of Mexico, TD 10,998 ft., top sand 9,916 ft., perf. 9,916-26 ft., 2,369,000 cu. ft. of gas per day and 22 bbl. of 51.2°-gravity condensate, GOR 107,682, WP 3,815 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: W. B. Jayred B-1 W. E. Walker, South Lake Charles area, 32-10s-8w, 2 mi. N of South Lake Charles production, dry, TD 9,750 ft.

Cameron Parish: The California Co. 1 State Lease 344, in Grand Lake, 13s-4w, dry, TD 10,128 ft.

Magnolia Pet. Co. 1 Calcasieu Lake, 7-14s-10w, 4,500 ft. N of 1 Vincent (gas well) at East Mud Lake, dry, TD 11,883 ft.

Rapides Parish: Chicago Corp. 1 W. E. Carter, Miltonberg area, 63-4n-2w, dry, TD 11,836 ft.

MISSISSIPPI

Franklin County Discovery Is Turned to Tanks

JACKSON.—H. L. Hunt 1 W. L. Graves, Section 29-6n-2e, potential new discovery in Franklin County, located approximately 2 miles east and 1½ miles south of the town of Roxie, had heater installed and was turned to the tanks the first part of the week. Last reports state that the flow from the well has stabilized but no attempt has been made to measure the rate or amount of flow. Total depth is 10,990 ft., with perforations at 10,578-85 ft.

At Cranfield field, Franklin County, The California Co. 1 Cranfield Unit 9, Tract 47, 32-7n-1e, has been completed for an initial potential flow of 251 bbl. of 38.9°-gravity oil per day through a 14/64-in. choke, tubing pressure 900 psi., gas-oil ratio 1,120.

Walter E. Sistrunk 1 I. S. Martin, 36-10n-9w, at Eucutta field, Wayne County, was completed through perforations at 5,042-52 ft. and 5,113-24 ft., pumping 193 bbl. per day. Total depth is 5,119 ft.

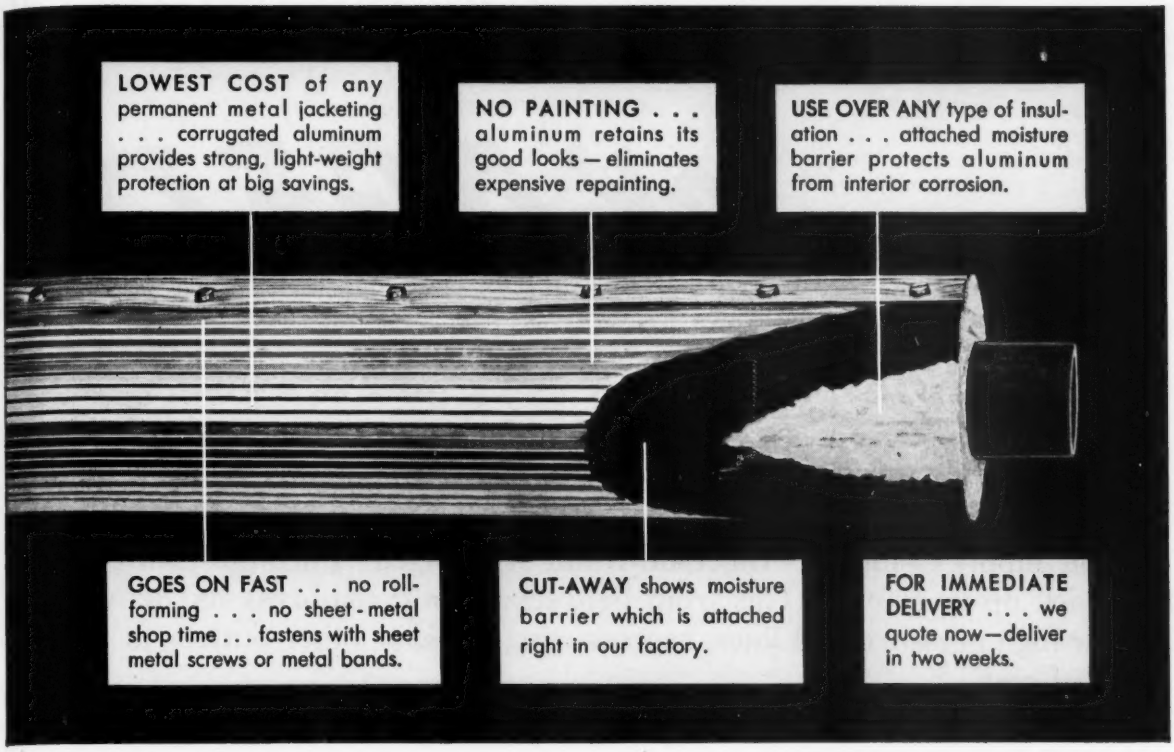
In La Grange field, Adams County, Burden & Kemp-Gilster 6 Marks, 7-6n-2w, flowed an initial production of 100 bbl. of 43.3°-gravity oil per day through a 16/64-in. choke, tubing pressure 150 psi. Total depth is 6,286 ft. In South La Grange, Kemp Drilling Co. 2 E. B. Ogden, 32-6n-2w, was completed flowing 278 bbl. of 44°-gravity oil through 10/64-in. choke, tubing pressure 630 psi., casing pressure 450 psi. Total depth is 6,435 ft., and perforations are from 6,379 to 6,398 ft.

Phillips Petroleum Co. 1 James Ware, 37-8n-2w, in Pine Ridge field, Adams County, on potential gage flowed 134 bbl. of 40.7°-gravity oil per day through a ⅛-in. choke, tubing pressure 480 psi.

MISSISSIPPI WILDCAT FAILURES

Jones County: Ginther, Warren & Ginther 1 B. M. Murphy, 10-6n-12w, dry, TD 8,875 ft.

Yazoo County: E. P. Thomas-J. A. Morgan 1 Callie Smith, 24-12n-5w, dry, TD 5,500 ft.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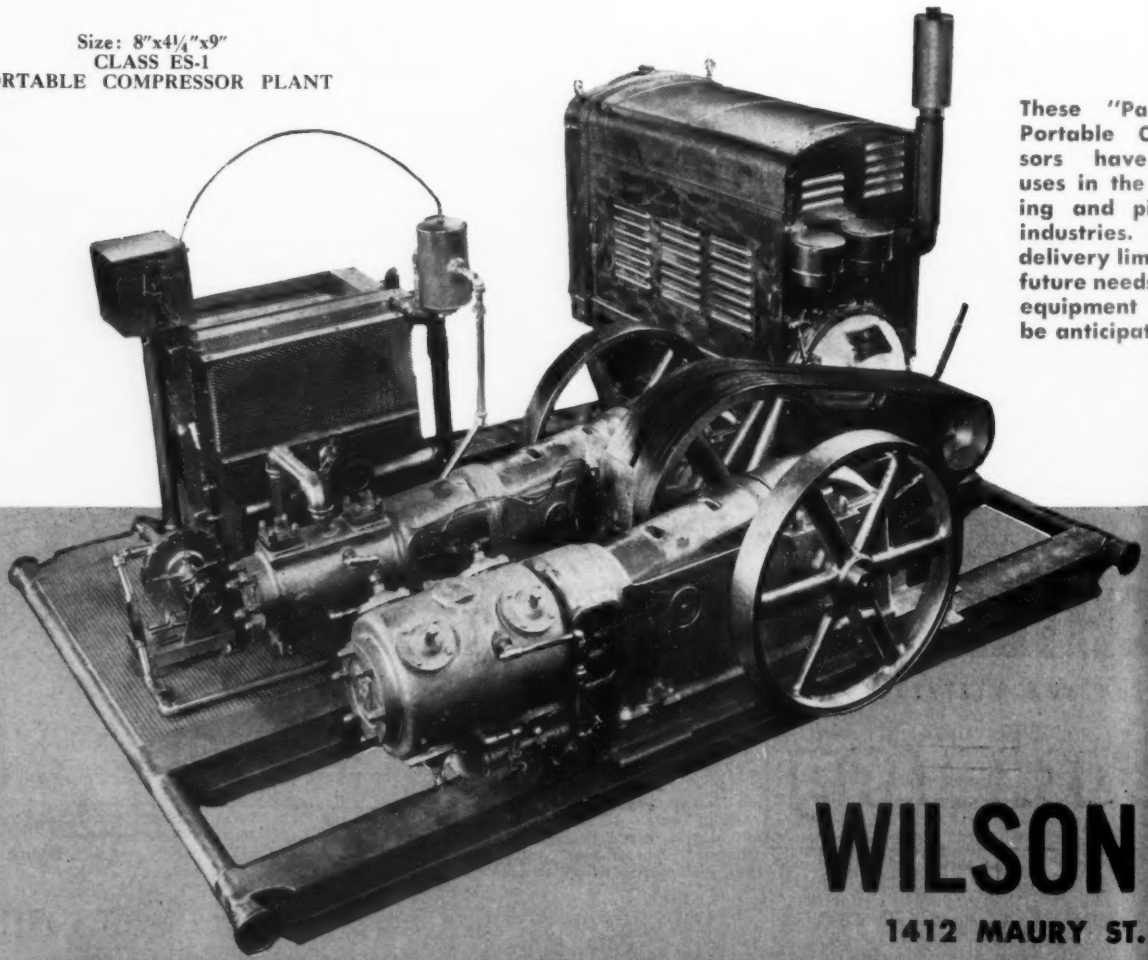

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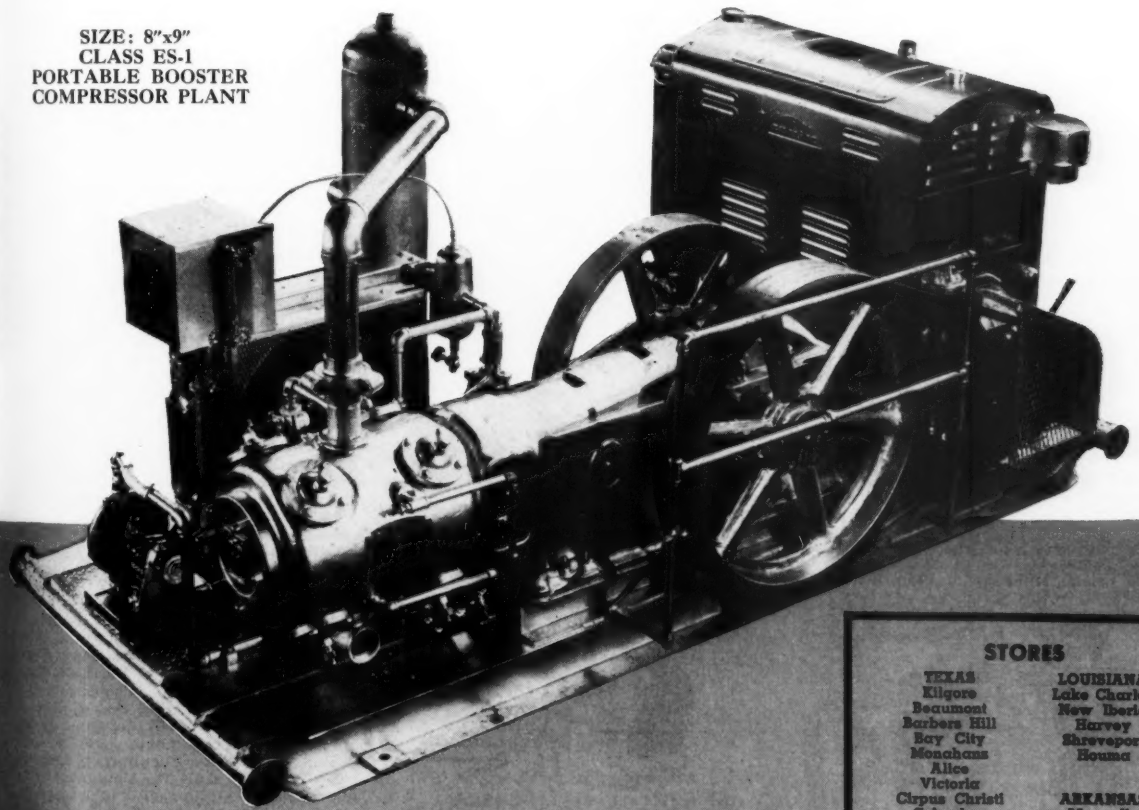

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N. CENTRAL TEXAS

Bridwell Oil Co. Extends Chico Pool

WICHITA FALLS.—Bridwell Oil Co. 1 Berry, J. C. Parry Survey, extended conglomerate production ½ mile west of the southern side of the Chico field, Wise County when it flowed oil on a drill-stem test. On the 75-minute test, from 5,556-90 ft., gas showed at the surface in 7 minutes, mud in 44 minutes, and oil in 47 minutes, flowing at the rate of 14 bbl. an hour for 28 minutes. Recovery in the pipe was not reported.

New exploration for Wise County included Cities Service Oil Co. 1 Ella T. McKissick, to be an 8,000-ft. test 3 miles southwest of Decatur in the east central part of the county. Location is 6,700 ft. from east and 3,850 ft. from south lines of the S. Isaacs Survey. R. B. Thrift, Trustee 1 C. A. Lawrence, was a new location 2¾ miles southwest of nearest production on the southwestern side of the Chico field, in the J. B. Patterson Survey, A-953. The new 6,000-ft. wildcat is 6 miles west and slightly south of the town of Chico, and about ¾ mile east of the Jack County line.

An old well drilled deeper, on the east side of the KMA area of southwestern Wichita County, has been completed as an important Ellenburger discovery. It is Lebus Oil Co. 1-A Hodges, H. B. Balch Survey, A-26. Lebus drilled it on down from the regular KMA pay to the Ellenburger from 4,250-4,307 ft. From that interval it flowed 117 bbl. of oil in 3 hours, after acid treatment, and was given a calculated daily potential of 936 bbl. of oil. Nearest Ellenburger production is about 5 miles to the southwest.

Continental Oil Co. 1 H. A. Richardson, Montague County wildcat in Section 70, Titus CSL, 7 miles southeast of Bowie, reported additional oil from an unidentified limestone section. The first drill-stem test of the lime, from 6,055-71 ft., recovered approximately 6,000 ft. of oil, plus 210 ft. of oil-cut mud. Details on a second test were not completed at this report, but the 2-hour test at 6,071-84 ft., was said to have showed gas at the surface in 20 minutes.

In Throckmorton County, Fred M. Manning, Inc., 3 Gober, Block 3, Day Land & Cattle Co. Survey, 5 miles southeast of Throckmorton, extended Caddo production ½ mile to the south of the Gober field. It flowed 160 bbl. of oil in 24 hours, from pay at 4,707-22 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Jack County: Davon Oil Co. 1 W. J. Dees, Geo. Taylor Sur., A-844, 4 mi. N Joplin field, flowed 12 bbl. of 57°-gravity distillate a day and estimated 1,500,000 cu. ft. gas from conglomerate at 4,970-90 ft., ⅛-in. choke, tubing pressure 340 psi. TD 6,490 ft., elev. 891 ft., Caddo 4,490 ft., Simpson 6,320 ft.

Shackelford County: McElroy Ranch Co. 1 Pittman and Reynolds, Sec. 2, Blk. 11, T&P Sur., 7 mi. E Albany, flowed 224 bbl. of 43.5°-gravity oil in 7 hours from Ellenburger at 4,533-38 ft, TD. 16/64-in. choke, tubing pressure 570 psi., casing 585 psi., GOR 750 cu. ft., elev. 1,349 ft.

Wise County: Standard Fryer, Inc., 2 R. L. Morris, 990 ft. from N and E lines, W. Bohn Sur., A-1,366, 5 mi. W Chico townsite, flowed 709 bbl. a day from conglomerate at 5,424-36 ft., open 2-in., GOR 575 cu. ft., TD 5,465 ft., elev 920 ft. TD 5,465 ft., elev. 920 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Clark Drilling Co. 1 J. M. Powell, Wm. Henry Sur., 1 mi. NE Archer City, dry, TD 3,906 ft.

Henry Grace Production Co. 2 J. R. Parkey, Blk. 41 Dallas CSL, 15 mi. W Archer City, dry, TD 1,475 ft.

G. E. Kadane & Sons 1 W. E. Wolf, M. H. Finch Sur., 1½ mi. SE Mankins, dry, TD 1,772 ft.

Southern Petroleum Exploration Co. 1 L. F. Wilson Estate "F," Lot 4, Blk. 117, ATNCL Sur., 4 mi. N Archer City, dry, TD 4,320 ft.

Baylor County: C. U. Bay 1 Finn Caussey, Sec. 147, T&NO Sur., 1½ mi. SE Seymour, dry, TD 5,760 ft., Caddo 5,294 ft., Chappel 5,700 ft.

Callahan County: C. U. Bay 1 Harris & Barton, Sec. 8, BBB&C Sur., 9 mi. SW Baird, dry, TD 4,654 ft., Palo Pinto 2,848 ft., Caddo 3,994 ft., Mississippi 4,465 ft., Ellenburger 4,553 ft., elev. 1,939 ft.

Great Lakes Carbon Corp. 1 Beulah Byeatt, Sec. 44, BBB&C Sur., 4 mi. W Clyde, dry, TD 3,132 ft., Flippen 1,711 ft., Swastika 2,077 ft., Palo Pinto 3,113 ft., elev. 2,010 ft.

Comanche County: Burk Royalty Co. 1 M. R. Daniel, Andrew Jones Sur., 5 mi. E Gorman, dry, TD 2,857 ft., Caddo 2,645 ft., Marble Falls 2,755 ft., show of oil 2,735 ft.

Eastland County: Joe Josephson 1 L. R. Baskin, Sec. 7, D&DA Sur., 6 mi. SW Gorman, dry, TD 2,907 ft.

Montague County: R. B. Thrift 1 W. R. Potter, Sec. 2,813, TE&L Sur., 4 mi. NW Bowie, dry, TD 6,255 ft., Caddo 6,167 ft.

Stephens County: The Texas Co. 1 Alice Walker, Sec. 1,339, TE&L Sur., 7 mi. NE Breckenridge, dry, TD 4,560 ft.

Stonewall County: Texas Pacific Coal & Oil Co. 1 C. A. Brown, Sec. 6, Blk. D, H&TC Sur., 9 mi. NE Aspermont, dry, TD 6,555 ft., Palo Pinto 5,066 ft., Mississippi 6,215 ft., Ellenburger 6,245 ft., Hickory sand 6,504 ft., elev. 1,736 ft.

Taylor County: Drilling & Exploration Co. 1 S. D. Gamble, Sec. 7, Blk. 18, T&P Sur., 2 mi. W Merkel, dry, TD 3,750 ft., reef lime 3,676 ft., elev. 1,907 ft.

Carl Hovgard and Sojourner Drilling Co. 2 G. W. Hughes, Sec. 1, Blk. 18, T&P

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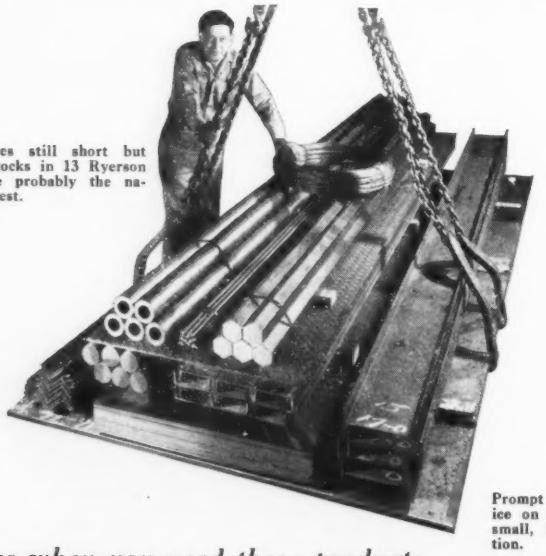

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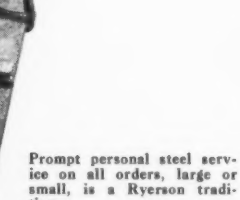

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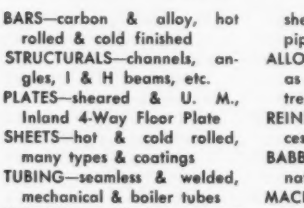

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Sur., ½ mi. SE Blair, dry, TD 3,725 ft., Flippen 2,822 ft., Hope 2,863 ft., Swastika 3,266 ft.

Throckmorton County: Warren Oil Corp. 2 J. T. Davis "B," Sec. 163, BBB&C Sur., 8 mi. SW Throckmorton, dry, TD 5,032 ft., Mississippi 4,924 ft., DST recovered gas.

Wichita County: Akin & Dimock 2 J. C. Murphree, Sec. 1, SA&MGRR Sur., 6 mi. W Iowa Park, dry, TD 2,018 ft. in sand.

Wise County: Cities Service Oil Co. 1 E. D. Monk, Blk. 7, Bell CSL, A-27, 1½ mi. N Alvord, dry, TD 7,924 ft., Caddo 5,708 ft., Marble Falls 6,371 ft., Simpson 7,332 ft., Ellenburger 7,615 ft.

ROCKY MOUNTAIN

Byrd-Frost et al Get Big Gas-Condensate Strike

DENVER.—Tests following installation of separators and other equipment at the Byrd-Frost, Inc., Western Natural Gas Co. et al discovery in the Dove Creek area, Montezuma County, Colorado, indicate that the well will be an excellent gas and condensate producer. At the end of 4 days shut-in period, the pressure on the well was 2,600 psi., and following tests dropped to around 2,000 psi. The well flowed 34 bbl. of 68°-gravity condensate the first hour and 22 bbl. the second hour. Gas volume on the test gaged 5,000,000 cu. ft. per day. The operator is continuing to test the well and marketing arrangements will be dependent upon future planning. Possibility of a pipe line from the San Juan and Salt basins of Colorado and Utah through Salt Lake City to the Pacific Coast has been mentioned, but at present no definite arrangements have been made for such a line. This discovery, the 1 Driscoll, C N½ NE NW 3-38n-19w, was drilled to 8,286 ft. in the Mississippian prior to plugging back to 5,950 ft. for a more thorough test of gas logged in the Paradox formation. Casing was perforated between 5,910-34 ft. and the well flowed approximately 2,000,000 cu. ft. of gas on a brief test. The lime zone was then acidized and the well flowed an estimated 10,000,000 cu. ft. daily, with an unmeasured amount of condensate. Later the well was again opened and flowed considerable condensate with the gas, with estimate as high as 500 bbl. daily. This well is rated of considerable regional importance in an exploratory drilling campaign being carried on by these operators throughout the San Juan and Salt basins of the four-state area. The same operators have established small oil production in the Boundary Butte field, San Juan County, Utah, and at Kutz Canyon, San Juan County, Colorado. A gas discovery was made in the Pennsylvanian at Boundry Butte and carbon dioxide gas developed at McElmo field, Montezuma County, Colorado. Two deep dry holes have been drilled at Montecello, Utah, and Glade anticline, Colorado. The present discovery is the first well to find production in the Paradox (Pennsylvanian) in this region of the state, and it is expected that there will be deep drilling on several large blocks in this area as a result of the recovery of condensate and gas in this well.

Pure Oil Co. has run casing to the top of the saturated zone at the West Poison Spider new pay at the 2 Unit, C NW NW 11-33n-84w, Natrona County, Wyoming, and is preparing to drill plug on the well. Seven-inch casing was cemented at 9,230 ft. with total depth at 9,288 ft. This well flowed at the rate of 53 bbl. of 45.2°-gravity oil per hour on drill-stem test prior to setting pipe. This is the first well in the Rocky Mountains to test commercial production in sands of the Mesa Verde formation (upper Cretaceous) although shows have been encountered in several wells in these sands. The Mesa Verde was topped at 7,285 ft. in the well, and there is approximately 2,500 ft. of sands and shales in the formation. The discovery well at West Poison Spider was completed last spring as a producer in the Frontier formation at 14,309 ft., total depth, the deepest producing well in the world.

A gas discovery has been made by General Petroleum Corp. in its 55-34-G, NW NW SE 34-4n-89w, on Pagoda anticline, Routt County, Colorado. The well tested at the rate of 10,000,000 cu. ft. of gas daily from the Shinarump between 3,957-4,037 ft. The well was drilled into the Morgan formation at 4,900 ft., total depth, and plugged back for tests. The operator has moved out rotary and will probably shut the discovery in for the winter, and resume tests next spring. This is the second discovery in the Shinarump in the Uinta basin of northwestern Colorado and northeastern Utah. Continental Oil Co. completed a Shinarump oil discovery in the Rangely field, Rio Blanco County, 70 miles west of Pagoda and this was the only producer in that formation in the field. Shows of oil and gas were logged in this formation in a wildcat drilled by Union Oil Co. at Beaver Creek, adjoining Pagoda on the west, but these shows were not commercial.

Stanolind Oil & Gas Co. is now testing its joint operation with Ohio Oil Co. on the Enos Creek structure at the 1 L. U. Sheep, SE SW NW 25-46n-100w, Hot Springs County, Wyoming. This discovery has been shut down for several weeks, waiting on pump. Pump has now been installed and on test this week, the well pumped at the rate of 200 bbl. of oil daily. This is the first deep test on this structure, and production was established on drill-stem test in the Phosphoria and Tensleep zones. Present production is from the Tensleep, with the well plugged back to 6,488 ft. from 7,139 ft., total depth. Top of the Phosphoria was logged at 6,142 ft. and this zone had approximately 200 ft. of saturated lime. Tensleep was found at 6,365 ft., and Madison at 6,896 ft. It is expected that the Phosphoria will be tested in the well prior to

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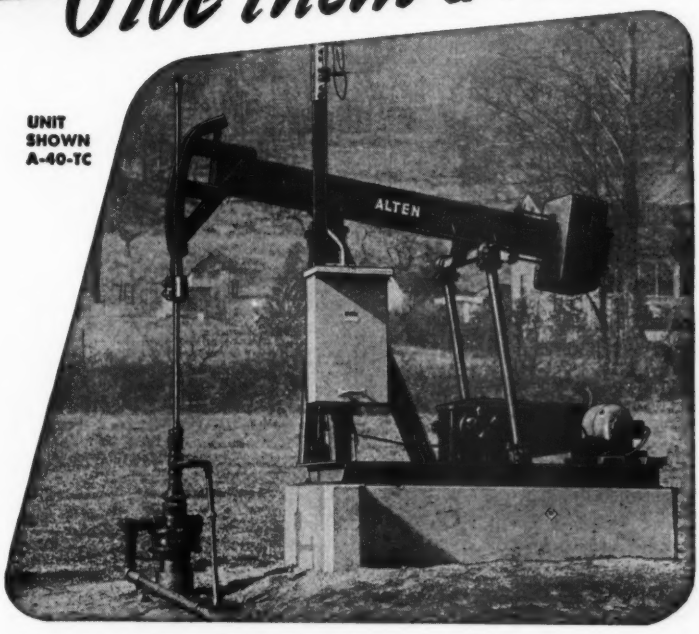

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final completion. The discovery well on this structure found gas in the Frontier and has been shut in since completion more than 20 years ago.

New locations.—There were 12 new locations during the week, with 9 in Wyoming, 2 in Montana and 1 in northern New Mexico. In Wyoming, Steelco Drilling Co. made location at the 1 Jarvis, C NW NW 10-29n-61w, Natrona County, for a granite test in the Bolton Creek area. All other locations were for pool wells.

MONTANA WILDCAT FAILURES

Cherry Ridge, Blaine County: Burbridge-Unruh et al 1 Winterrowd, C SE SE 6-35n-21e, TD 2,375 ft., dry, Eagle 1,838 ft.

Snake Creek: Montana Gas Corp. 1 Hugsby, CWL NW NE 32-31n-20e, TD 669 ft., completed as a water well, Eagle 510 ft. water, Virgelle 618 ft. water.

WYOMING SUCCESSFUL WILDCAT

Fourbear, Park County: Honolula Oil Corp. 3 L. L. Anderson, SW NW SE 20-48n-103w, TD 3,941 ft., PB 3,702 ft., pumped 259 bbl. oil per day from Madison; Lakota 850 ft., Chugwater 1,590 ft., Dinwoody 2,610 ft., Embar 2,640 ft., Tensleep 2,875 ft., Amsden 3,177 ft., Madison 3,470 ft.

WYOMING WILDCAT FAILURES

Moorcroft, Crook County: Amerada Pet. Corp. 1 Robinson, SE SW NW 18-50n-67w, TD 5,090 ft., dry, Niobrara 2,905 ft., Greenhorn 3,602 ft., Dakota 4,898 ft., Fuson 4,960 ft., Lakota 5,024 ft., Morrison 5,051 ft.

Fossil area, Lincoln County: Palisade Pet. Co., Inc., 1 Govt., SE NW NW 23-21n-117w, TD 6,006 ft., dry, Brazer 5,120 ft., thrust fault 5,785 ft., Adaville 5,785 ft.

Alkali Creek, Niobrara County: British-American and Superior 1 Moore, NE NE NE 7-40n-62w, TD 5,315 ft., dry, Pierre 590 ft., Niobrara 3,533 ft., Greenhorn 4,210 ft., Graneros 4,300 ft., Dakota 5,135 ft., Fuson 5,246 ft., Lakota 5,265 ft., Morrison 5,277 ft.

West Fourbear, Park County: Wilshire and Atlantic 1 Fourbear, C NE NE 31-48n-103w, TD 4,622 ft., dry.

NORTHERN NEW MEXICO WILDCAT FAILURES

Pound Ranch, Rio Arriba County: Derby Drilling Co. et al 1 Apache, NE SE NE 33-28n-1e, TD 5,987 ft., dry, Dakota 1,810 ft., Morrison 2,068 ft., Entrada 2,825 ft., Chinle 3,070 ft., Pennsylvanian 5,150 ft.

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MICHIGAN

Pentwater Field Paces Active Week

MOUNT PLEASANT.—There were 21 well completions in the state during the past week, of which 12 were oil wells in 6 different fields, 1 a gas field completion and 8 dry holes, of which 7 were wildcats. New producers were completed in the Sterling Traverse - Dundee field, Arenac County, the Beaver Creek Richfield pool, Crawford and Kalkaska counties, the Eden field, Mason County, the Pentwater and Stony Lake pools, Oceana County, and the Geneva shallow Traverse pool, Van Buren County. A new gas well was added to the Edmore Stray sand pool, Montcalm County.

The most active completion area for the period was the Pentwater Dundee field where Carter Oil Co. added four new producers and Gulf Refining Co. finished one.

Permits for 12 new wells were approved. Total number of wells approved to date this year was boosted to 891, compared to a grand total during 1947 of 887.

In Mason County, Louis Rose 1 Goodrich, SW SW NW 27-20n-17w, closely watched wildcat, failed to show oil from the Dundee when casing was perforated in that zone, and preparations for perforation and test of the Traverse horizon were in progress.

The Roosevelt Oil & Refining Corp. announced that a Stray gas development program in the Isabella field, Isabella County, where Merrill Drilling Co. recently completed a flowing Dundee discovery well, was set to be started this week. Roosevelt has purchased the Stray gas sand equity owned by the Merrill company in about 4,000 acres of leases in the area. No Stray sand gas wells have been drilled in the district, but several tests, including the Dundee oil discovery, showed gas from the Stray sand when drilled.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: W. Spencer Cook 1 Stevens, SE NE SW 12-1n-16w, dry in Traverse, TD 1,208 ft.

Arenac County, Moffat Township: Don F. Rayburn & William B. Stewart 1 Ralph & Lottie Bliss, SE NE SW 21-20n-3e, dry in Dundee, TD 3,120 ft.

Barry County, Orangeville Township: Smith Petroleum Co. 1 John Carter, SE SW SW 3-2n-10w, dry in Traverse, TD 1,925 ft.

Bay County, Mt. Forest Township: Ward J. Blunt 1 Frank Kuriwchak, SE SE NE 1-17n-3e, dry in Dundee, TD 3,070 ft.

Kent County, Algoma Township: Socony Vacuum Oil Co., Inc., 1 Pennington, SE SE NW 9-9n-11w, dry in Traverse, TD 2,351 ft.

Ottawa County, Allendale Township: W. E. Wyse 1 Richard & Sarah Thompson, NW NW SW 26-7n-14w, dry in Traverse, TD 1,787 ft.

Holland Township: Ford Oil Co. 1 Harold Decker, NE SE SW 8-5n-15w, dry in Traverse, TD 1,535 ft.

SOUTHWEST TEXAS

Round Lake Oil Field Gets Second Producer

CORPUS CHRISTI.—Hewit & Dougherty and Lonnie Glasscock 1 C. E. Caddel is being completed as the second old producer at the Round Lake field of San Patricio County. The well flowed 160 bbl. of oil per day through a 9/64-in. choke with 350 psi. tubing pressure and 500 psi. casing pressure through perforations at 5,347-51 ft. This well is approximately ½ mile west-southwest of the 1 W. A. Jennings, discovery well, which was completed in 1946 through perforations at 5,442-56 ft. The Caddel is located in the C. C. Smith Subdivision, Block 3, John McMullen Survey, 1¼ miles east-southeast of the Gallagher field of Jim Wells County.

V. J. Meyer 1 Billy Holland, recent new shallow sand oil discovery in Edwards County, approximately 23 miles west of Rock Springs, in HE&WT Survey 35, has been gaged at 5 bbl. of 18°-gravity oil per day on pump, through open hole at 476-541 ft. Total depth is 1,166 ft. in lime, was plugged back to 530 ft. and drilled out to 541 ft. for the completion. Open hole was acidized with 1,000 gal. at 476-451 ft. prior to completion. The second well, 2 Holland, located 714 ft. northwest of the discovery, now is completed through open hole at 537-61 ft. for oil production with no details reported.

Magnolia Petroleum Co. et al 1 Carlson, wildcat test 2 miles southwest of Edinburg in Hidalgo County, is running production test through perforations at 7,862-82 ft. Hole was drilled to total depth of 11,264 ft., with 5-in. liner set to bottom. Through perforations at 10,943-11,003 ft., and 10,887-95 ft., it had flowed gas and condensate at the rate of 5,200,000 cu. ft. of gas and 29.9 bbl. of condensate and 7.4 bbl. of wash water per day through 3/16-in. choke. A leaky packer developed. Tubing was pulled and operators attempted to squeeze, but could not set packer. A cement plug was set in the hole at 10,342 ft. and squeeze job was made at 7,757-59 ft. and plugged back to 8,850 ft. for the present testing.

The second test in the new discovery area about 3½ miles southwest of the Charlotte field in eastern Frio County, Lewis Oil Co. A-2 Oppenheimer & Lang, recovered 640 ft. of pipe-line oil through ¼-in. top choke on a 10-minute drill-stem test at 5,598-5,605 ft. in the Navarro sand. Bottom-hole pressure registered 400 psi. flowing and 460 psi. shut in. Operators have set casing for completion in this section, with total depth of 5,605 ft. This well is located in Section 13, BS&F Survey, 990 ft. east and 660 ft. south of the B-1 Oppenheimer & Lang discovery well drilled by Parker & McCune.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCAT

Edwards County: New oil discovery—V. J. Meyer 1 Billy Holland, HE&WT Sur., 23 mi. W of Rock Springs, TD 1,166 ft., PB 541 ft., open hole 476-541 ft., 5 bbl. of 18°-gravity oil per day on pump.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

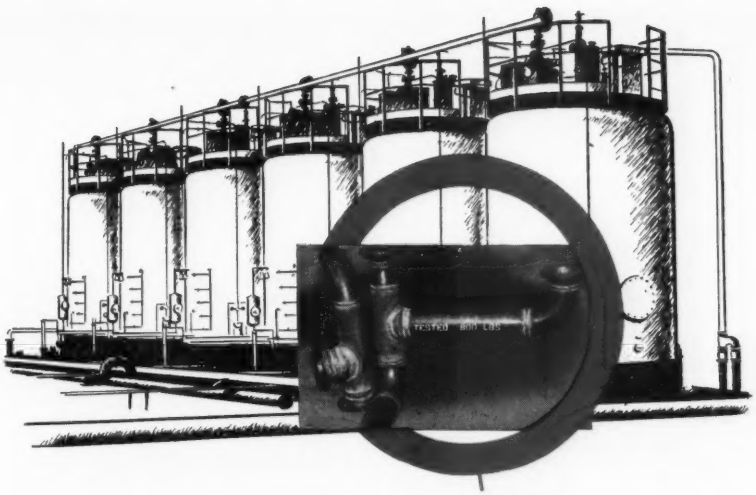
Atascosa County: M. G. Perry 1 R. L. Eschenberg, Wm. A. Hesskew Sur. 46, 4 mi. E of Campbellton, dry, TD 6,183 ft.

Bastrop County: S. D. Rorem and W. C. Jackson 1 W. E. Watterson, E. W. Barton League, 9 mi. SW of Bastrop and 3 mi. E of Hilbig field, dry, TD 3,612 ft.

Duval County: Bridwell Oil Co. 2 J. T. Dinn, H. J. Allison Sur. 458, 12 mi. NNW of Hebbronville and 3 mi. NE of Cam field, dry, TD 2,842 ft.

M. E. Davis A-1 Leroy Denman, Santos Garcia Sur., 3 mi. E of Realitos, dry, TD 5,854 ft.

Edwards County: Great Expectations Oil



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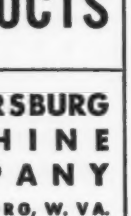

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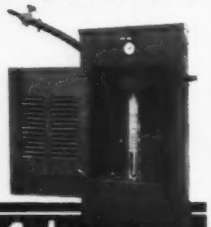

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Co. 2 Ed C. Mayfield, GC&SF Sur. 3, 20 mi. W of Rock Springs, dry, TD 356 ft.

Hidalgo County: Continental Oil Co. 3 Lloyd M. Bentsen, Los Gauges Grant, Javelin area, dry, TD 6,216 ft.

Jim Wells County: Sam E. Wilson 1 Bonner, Sec. 12, Theodora Plummer resubd. Camada Ranch, 8 mi. SW of Alice, 5½ mi. SE of San Diego, dry, TD 6,228 ft.

Nueces County: Panhandle Producing & Refining Co. 3 W. C. Rivers et al, Agua Dulce Farm Lots, 3 mi. E of Agua Dulce, dry, TD 6,901 ft.

Starr County: A. & T. Drilling Co. 3 Anna M. Kelsey, Sur. 71, 20 mi. N of Roma, and 8 mi. NW of El Sauz, dry, TD 1,044 ft.

Webb County: Long Bros. 1 Clyde Jennings, Samuel Vanover Sur. 201, 11 mi. NE of Oilton, dry, TD 3,507 ft.

EASTERN TEXAS

Freestone Deep Wildcat To Continue Testing

DALLAS.—Humble Oil & Refining Co. 1 R. P. McWatters, deep test 1½ miles south of Freestone, Freestone County, was said to be awaiting blowout preventer before testing gas shows in the Cotton Valley. Total depth was given as 16,347 ft., plugged back to 11,771 ft. Results of electrical surveys made from 11,711 to 6,700 ft. were not reported, but according to previous and unofficial releases on the well, it had some oil shows, and a good gas kick while drilling. Top of the Cotton Valley was around 10,470 ft., on an elevation of 489 ft. This test has been more than 1 year in drilling.

Standard Oil Co. of Texas 1 T. E. Acker, prospective gas-distillate discovery northwest of Maydelle, Cherokee County, was apparently being held up for tubing. On last report it acidized and drill-stem tested from 8,610-50 ft., recovering 30 ft. of distillate, 210 ft. of salt water and gas at the rate of 1,000,000 cu. ft. daily.

Stanolind 1 Tom & Walton Deupree, Henderson County wildcat, drilled ahead below 11,072 ft. in shale and lime. This test had top of the James lime around 10,750 ft., and showed a gas kick while drilling at 10,742 ft. Electrical surveys were run to 10,755 ft., but a planned drill-stem test was not reported.

In Lee County, 2 miles north of Lexington, L. M. Lockhart 1 J. A. Reat, John Newton Survey, made a 7-minute drill-stem test from 9,744-78 ft., using ¼-in. chokes and 1,000 ft. of water cushion. It made a slight blow and recovered 90 ft. of drilling mud, with no shows. It drilled ahead below 9,804 ft.

Two miles southwest of Bazette, Navarro County, J. L. Collins Co. et al moved in to rework the 1 Mrs. Lilly Barnett, B. G. Balthrope Survey, A-85. Old total depth was 6,504 ft., plugged back to 3,453 ft.

In Smith County, Humble 1 Everett Wintters was coring below 10,150 ft. in shale.

EAST TEXAS (DISTRICTS 5 & 6)
SUCCESSFUL WILDCAT

Henderson County: Arkansas Fuel Oil Co. 1 Sarah B. Adams, Harrison Graham Sur., A-222, 2 mi. E Garrison, flowed 1,310,000 cu. ft. gas a day, open flow, rock pressure 3,199 psi., distillate not gaged due to lack of storage and separators, perforated in Pettit at 7,109-19 ft., TD 7,861 ft., elev. 340 ft., main Rodessa porosity 6,110 ft., James 6,510 ft., Pettit 6,785 ft., Travis Peak 7,346 ft.

EAST TEXAS (DISTRICTS 5 & 6)
WILDCAT FAILURES

Bosque County: American Liberty Oil Co. 1 H. J. Reichert, Joseph Harlan Sur., 7 mi. N Valley Mills, dry, TD 8,000 ft., Ellenburger 7,549 ft. had salt water, elev. 852 ft.

Ellis County: R. Heber Smith 1 Y. Barron, Sec. 22, De la Pena XI League Grant, 3½ mi. E Palmer, dry, TD 3,135 ft., had slight show of oil 710-872 ft., elev. 423 ft.

Van Zandt County: R. J. Caraway 1 E. L. Swain, J. C. Payne Sur., 4½ mi. S Grand Saline, dry, TD 5,400 ft.

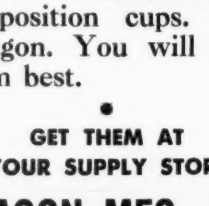
APPALACHIAN FIELD

United Fuel Gas Co. Stakes New Wildcat

PITTSBURGH. — A new location for a wildcat test was announced by United Fuel Gas Co. 6,478 A. W. Hicks, elevation 2,834 ft., in Beaver Pond district, Mercer County, West Virginia. It is located on the Bluefield Quadrangle 0.4 mile south of Latitude 37 degrees, 20 minutes, and 3.25 miles west of Longitude 81 degrees, 10 minutes. In Davis district, Tucker County, Cumberland & Allegheny Gas Co. 1-A-418 West Virginia Power & Transmission Co., elevation 3,296 ft., is drilling at 8,062 ft., or approximately 59 ft. in the Oriskany Sand. The well is located northeast of the Kuykendall successful wildcat drilled several years ago. In Sheridan district, Calhoun County, Richter Oil Co. completed the 3 Rilla D. Snyder, testing 30 bbl. of oil per day from the Salt sand. Total depth is 1,942 ft. In the Silverton oil pool, Ravenswood district, Jackson County, J. J. Farnsworth drilled in the 1 Delbert Wood for 50 bbl. of oil per day from the Berea sand. Total depth is 2,089 ft. In Union district, Putnam County, Sweetland Land & Mining Co. 2-75 United Fuel & Gas Co. gaged 2,374,000 cu. ft. of gas from the Brown shale. Total depth is 3,340 ft.

New locations reported in West Virginia were 19: Birch district, Braxton County; Sherman district, Calhoun County; DeKalb district, Gilmer County; Ravenswood district, Jackson County; Elk district, Kanawha County; Harts Creek and Laurel Hill districts, Lincoln County; Grant and Union districts, Marion County; Beaver Pond district, Mercer County; Adkin district, McDowell County; Grant district, Nicholas County; and Jefferson, McKim and Union districts, Pleasants County.

New locations reported in Pennsylvania were three: Rayburn and Red Bank townships, Armstrong County; Franklin Township, Greene County.



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Bienville Test Shows Gas in Travis Peak

SHREVEPORT.—Placid Oil Co. 1 Bienville Lumber Co., 8,500-ft. wildcat in 9-14n-7w, Bienville Parish, had a strong show of gas in the Travis Peak at 7,410-26 ft. Operators reported the well tried to blow out when drilling at that depth. A drill-stem test of the interval, using ¼-in. chokes and 1,500 ft. of water cushion, recovered the water plus 200 ft. of gas-cut mud in 20 minutes. Maximum pressure on tubing was 1,500 psi. Bottom-hole flowing pressure was 3,800 psi. A core from 7,411-25 ft. recovered 6 ft. of fine white sand having fair porosity, but no shows, 1 ft. of dark gray sand with salty taste and 2 ft. of white sand. Operators were drilling below 7,427 ft. Top on the Travis Peak was not reported.

In Caddo Parish, Phillips Petroleum Co. 1 Ellerbe, 17-15n-12w, was shut down for repairs at 7,472 ft.

M. A. Halsey 1 Bishop-Lewis Unit, 30-20n-6w, Athens field deep test, Claiborne Parish, was a dual completion in the Travis Peak and Cotton Valley after drilling to 9,523 ft. and plugging back to 8,566 ft. It is a new pay discovery for the field, other wells producing in the Cotton Valley only. In 10 hours it flowed at the rate of 3,400,000 cu. ft. of gas daily, plus 19 bbl. of distillate per million cu. ft., through ¼-in. chokes, from the Travis Peak at 7,210-40 ft. Calculated open flow from the Cotton Valley, at 8,500-22 and 8,528-44 ft., was 10,500,000 cu. ft. of gas daily, plus 24 bbl. of 60.4°-gravity distillate per 1,000,000 cu. ft.

Hunt Oil Co. 1 W. A. J. Peevey, 32-15n-3w, Jackson Parish, was shut down for repairs at total depth of 8,660 ft. in the lower Glen Rose. The California Co. 1 Brown Paper Mill, 10-16n-3e, Ouachita Parish, was drilling Travis Peak at 6,588 ft. Barnsdall Oil Co. 1 Robert Sykes, 1-22n-9w, Webster Parish, was coring Smackover lime below 11,403 ft. It cored from 11,355-403 ft. but lost the core in the hole, then reamed out to 11,403 ft.

Stanolind & Continental 1 Viola Mitchell, 31-23n-9w, was a definite Cotton Valley discovery in the shallow Shongaloo field of Webster Parish. Operators were waiting on potential gage, after testing 2,100,000 cu. ft. of gas daily, plus 260 bbl. of around 59°-gravity distillate a day on ¼-in. chokes. Total depth was 11,295 ft., in the Smackover, plugged back to the Cotton Valley at 10,505 ft., and perforated at 10,327-333 and 10,308-320 ft.

In Ashley County, Arkansas, Superior Oil Co. 2 Bradley Lumber Co., 2-19s-10w, north offset to the company's Cotton Valley discovery, was dry at 6,060 ft., total depth. A drill-stem test at 6,038-56 ft. recovered water cushion and brackish water, with no shows. The discovery made 53 bbl. of oil a day from perforations at 6,038-43 ft.

Lion Oil Co. 1 Story, 20-18s-19w, Columbia County, was drilling below 5,905 ft. in the lower Glen Rose. The Palmer Oil Corp. 1 J. A. Thomas, new Glen Rose test in 15-16s-23w, Lafayette County, was drilling at 3,440 ft. Stanolind 1 Union Saw Mill, 18-19s-24w, had no shows in a core from 11,205-253 ft., then plugged back from 11,440 ft. to 9,500 ft. and planned to drill-stem test at 9,478-9,504 ft.

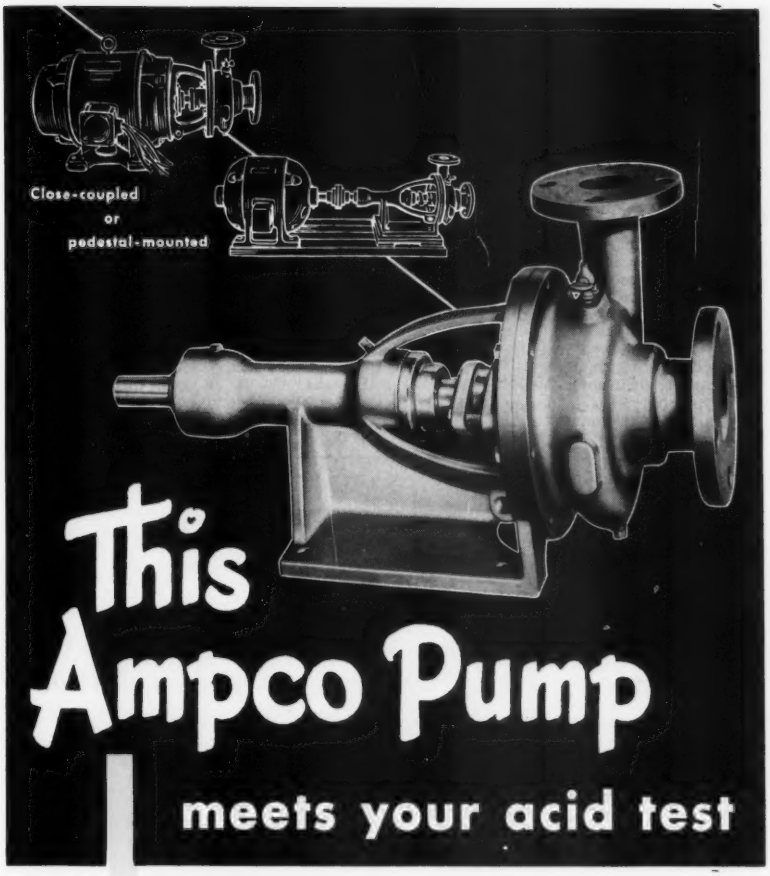
NORTH LOUISIANA WILDCAT FAILURES

DeSoto Parish: A. J. Slagter, Jr., 1 Joe Moran, NW SW NE 15-14n-13w, dry, TD 5,226 ft., Massive anhydrite 4,680-4,925 ft., elev. 175 ft.

Ouachita Parish: V. V. Bull 1 Huenfield, NW NE SW 29-18n-5e, dry, TD 4,926 ft., no tops reported.

Webster Parish: Hunt Oil Co. 1 R. P. Campbell, NW NE 14-23n-10w, dry, TD 11,700 ft.

R. J. Montomery 1 Hartman, NE SW NE 31-20n-10w, dry, TD 420 ft.



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PERMIAN BASIN

Magnolia's Upton Discovery Continues to Drill and Test

MIDLAND. — Magnolia Petroleum Co.s northern Upton County wildcat, the 1-A TXL, recovered additional oil on its third drill-stem test of the Ellenburger and was generally considered to be a discovery, although additional testing will have to determine its value. Entering the Ellenburger at 12,530 ft., or minus 9,640 ft., it had recovered free oil and oil-cut mud on all tests to 12,655 ft.; the next lower test, to 12,705 ft., had heavily oil and gas-cut mud and water blanket, but no free oil. It was to drill ahead to test.

The Ellenburger was topped at 12,530 ft., or minus 9,640 ft. Details of the four drill-stem tests, each with ⅜-in. and 1-in. chokes, and 2,000-ft. water blankets, were: from 12,530-565 ft., gas came to the top in 55 minutes, rated at 35,000 cu. ft. daily, and recovery was 900 ft. of 51°-gravity oil and 180 ft. of oil and gas-cut mud in addition to oil-cut water blanket; at 12,565-12,605 ft. on a 5-hour test, the recovery was 910 ft. of oil and gas-cut mud, and 546 ft. of oil, with gas about doubled in volume; from 12,605-655 ft., open 3 hours, gas came to the top in 55 minutes and the recovery was 670 ft. of 52.4°-gravity oil, 360 ft. of oil and gas-cut mud, plus the water blanket heavily cut with oil and gas, with bottom-hole flowing pressure of 1,250 psi.

On the fourth test, from 12,655-12,705 ft., open 2 hours and 10 minutes, at which time the packer failed, gas come to the top in 1 hour and the recovery was 210 ft of oil and gas-cut mud, 1,640 ft. of gas-cut water blanket, 180 ft. of gas, oil and mud-cut water blanket, and 7,650 ft. of gas-cut mud. Bottom-hole flowing pressure was 1,000 psi. There was no free oil recovered on the last test. No formation water has appeared on any of the tests. Operators believe most of the gas is coming from the Strawn below the 9⅝-in. casing, set at 8,902 ft.

Other Upton County activity included Humble Oil & Refining Co. 1-B Barnett, 1 mile southwest of the Benedum discovery, which drill-stem tested from 10,243-291 ft. in the Pennsylvanian. Gas came to the top in 26 minutes, estimated at 20,000 cu. ft. daily, and recovery was 180 ft. of heavily oil and gas-cut mud. It drilled ahead below 10,317 ft. West of the field, Richardson & Bass 1 Neal acidized Devonian perforations from 11,350-370 ft. and 11,390-410 ft., then prepared to retreat with 3,500 gal. It is plugged back from 12,543 ft. to 11,539 ft. Holes from 11,450-530 ft. were squeezed and new perforations made at the two intervals above.

A number of oil operators were attracted to the town of Bronte, in eastern Coke County, this week when Humble Oil & Refining Co. 1 R. E. Hickman became the second producer in the Bronte (Palo Pinto) field, just east of the townsite. Humble's well, in Section 453, Block 1-A, H&TC Survey, is an east offset to the discovery and only producer. Early in the week the 1 Hickman gaged 75 bbl. of oil in 30 minutes through 1-in. choke. The flow was made on a drill-stem test, from packer at 4,350 ft. to 4,390 ft., total depth. Gas came to the surface in 3 minutes and oil in 9 minutes. The oil tested 45.2° gravity. It was to deepen another 30 or 40 ft. before attempting completion. The original well completed for 72 bbl. daily.

Fifteen miles southeast of San Angelo, in Tom Green County, Plymouth Oil Co. 1 Green, Section 193, District 11, SP Survey, was showing for a Pennsylvanian discovery. Top of Strawn was at 4,570 ft., on elevation of 2,124 ft., and according to local information, it was running high to dry holes in nearby areas. On a drill-stem test from 4,694-4,744 ft., total depth, gas came to the surface in 29 minutes. There was no fluid at the top, but some opinion was that it might have flowed if the tool had been open longer than the test period of 43 minutes. Recovery in the pipe was three stands of oil and gas-cut drilling mud. Operators then cored ahead to 4,754 ft., recovering additional limestone with oil saturation. Formation water has not been encountered. After reaming, casing is to be set at 4,700 ft. for production test.

Sinclair Prairie Oil Co. 5-154 University, Section 24, Block 13, University Lands, Shafter Lake's first prospective Ellenburger producer, was swabbing wash water with a good show of oil and gas, from perforations at 11,685-11,750 ft.

In Dawson County, a 2¼-mile northwest extension to the Welch field was completed by Tide Water Associated Oil Co. at its 1 Everett Turner, Section 2, Block C-39, PSL. Initial potential was 59.7 bbl. of 34°-gravity oil, plus considerable water, from perforations at 4,880-4,913 and 4,915-21 ft.

On the east side of the Arick field of southeast Floyd County, General American Oil Co. 2-B Carmickle indicated a new pay zone, in the lower Permian. Regular pay formation is the Pennsylvanian. On a test of the Permian, through perforations at 4,798-4,810 ft., the swab was run six times and the well kicked off and flowed for 6 hours, averaging about 34 bbl. of 34.5°-gravity oil an hour, with no water. It has also shown for production in the regular pay from 5,775-5,856 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Gaines County: Argo Oil Corp. 1-N E. H. Jones, Sec. 496, Blk. G, CCSD&RGNG Sur., 10 mi. SW Denver City, swabbed 690 bbl. of 41.6°-gravity oil a day, Devonian 11,125-150 ft., GOR 190 cu. ft., TD 11,205 ft., PB 11,192 ft., elev. 3,594 ft.

Scurry County: Standard Oil Co. of Texas 1 Mrs. Jessie Brown, Sec. 440, Blk. 97, H&TC Sur., 8½ mi. N Snyder, flowed 532 bbl. of 42.5°-gravity oil in 24 hours,

(Continued on page 154)

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KANSAS

Barton County Wildcat Has Good Oil Show

BEN F. BRACK has a prospective oil well at 1 Wright, NE NE SW 32-20s-13w, Barton County, about 1 mile east of Hiss pool. Casing was set on top of the Arbuckle at 3,545 ft. and when the plug was drilled to the total rotary depth of 3,561 ft. there was a fillup of 2,150 ft. of oil in 12 hours. The Lansing was called at 3,293 ft. with saturated sections found at 3,310-27 ft., 3,370-85 ft., 3,420-25 ft., and 3,450-56 ft.

Brack has set casing and is drilling plug at 1 State, SW SW NE 5-20s-13w, Butler County, about 1 mile south of Great Bend pool. Casing was set at 3,207 ft. on top of the Lansing. Total depth is 3,665 ft. in the Arbuckle.

Robert L. Williams is reported to be swabbing 4 bbl. per hour at 1 Pritchard, NE NE NE 22-22s-14w, Stafford County. The well found water at total depth of 3,850 ft. and was plugged back to 3,724 ft. for tests of the Lansing-Kansas City. Pipe was perforated with 20 holes at 3,485-90 ft. and the zone was given two acid treatments before swabbing at the above rate. Other shows in the lower zones may be tested.

Bay Petroleum Corp. has a show of oil and gas at 1 Shartz, SW SW SE 7-20s-12w, about 5 miles west of Silica pool in Barton County. The Lansing was called at 3,172 ft. and a 20-minute drill-stem test at 3,195-3,201 ft. had a recovery of 35 ft. of oil and gas-cut mud. Operator is preparing to run another test at 3,218-33 ft.

In the southeastern corner of Barber County, Lindas & Armer 1 Pfaff, NW SE NE 15-34s-10w, topped the Mississippian at 4,634 ft. with porosity and odor at 4,650-53 ft. Operator is preparing to run drill-stem test.

In the northwestern part of Graham County, Derby Oil Co. and Peel Drilling Co. will test a show of oil in the Arbuckle at 1 Toll, SW SW SE 15-7s-25w. The Lansing was topped at 3,947 ft. with a slight show at 3,810-83 ft. The top of the Arbuckle was called at 4,237 ft. and total depth is 4,244 ft. Casing has been set to 4,240 ft.

For the week, 51 new locations were announced with 10 of the spots in Butler County. Other counties in order were: Rice with nine, Barton with eight, and Rooks with seven.

KANSAS SUCCESSFUL WILDCAT

Rooks County: Phillips Petroleum Co. 1 Nettie, SE SE SW 34-9s-17w, pumped 168 bbl. of oil per day from Lansing at 3,243-50 ft. and 3,260-68 ft.; Topeka 2,947 ft., Toronto 3,184 ft., Heebner 3,167 ft., Lansing 3,200 ft., conglomerate 3,482 ft., Simpson 3,496 ft., Arbuckle 3,513 ft., TD 3,545 ft.

KANSAS WILDCAT FAILURES

Gove County: Westgate-Greenland Oil Co. 1 Benson, C NE NW 6-14s-30w, dry, TD 4,946 ft., anhydrite 2,310 ft., Heebner 3,800 ft., Lansing 3,842 ft., Mississippian 4,562 ft., Arbuckle 4,883 ft.

Lyon County: Mendenhall 1 Hagan, NW NW NE 16-19s-10e, dry, TD 2,260 ft., Mississippian 2,220 ft.

Phillips County: Iron Drilling Co. 1 Ashcraft, NE NE SE 32-4s-18w, dry, TD 3,472 ft., Heebner 3,025 ft., Lansing 3,052 ft., Arbuckle 3,418 ft.

Rooks County: Sam Pack 1 Felderman, NE NE NE 8-7s-20w, dry, TD 3,732 ft., Topeka 3,146 ft., Heebner 3,379 ft., Toronto 3,410 ft., Lansing 3,419 ft., conglomerate 3,660 ft., Arbuckle 3,682 ft.

Sumner County: Tom Palmer 1 Leedy, SW SE SW 9-30s-3w, dry, TD 3,911 ft., Kansas City 3,234 ft., Mississippian 3,835 ft.

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CALIFORNIA

Hancock To Perforate New Field Prospect

LOS ANGELES.—Hancock Oil Co. appears to have excellent prospects for a new oil field discovery in the Gosford area of Kern County, approximately 2½ miles northeast of the Ten Section field. The company's wildcat venture, 85-23 K.C.L., 23-30s-26e, is standing with 7-in. casing cemented to bottom at 8,476 ft. and is expected to be gun perforated within a few days for a production test. The well encountered an oil sand, believed to be the upper Stevens, at the interval 7,835-73 ft. and an 18-minute formation test at 8,838-79 ft. resulted in the recovery of 1,310 ft. of oil and 170 ft. of salt water. Bottom-hole pressure during the test was recorded at 3,050 psi. Hancock officials are confident that they will obtain a well here, but to date they have refused to commit themselves as to the size well they expect.

R. W. Sherman's recent discovery well in the Newhall area of Los Angeles County, the 3-1 Newhall Community, 2-3n-16w, still has not been placed on production due to mechanical difficulties. During production tests to determine the well's productive capacity last week, water broke in and a new cement job was necessitated. Further developments in the area continue, however, with two additional wells located and about ready to start drilling. First of these is the R. W. Sherman 2-1 Newhall Community, 2-3n-16w, approximately 660 ft. southeast of the discovery well. Eagle Oil & Refining Co. also has announced location for a venture to be located about 1,000 ft. northwest of the discovery. This latter wildcat will be known as the 1 Eagle.

Humble Oil & Refining Co.'s first venture in California has ended in failure at a total depth of 5,119 ft. The well, 1 Di-Giorgio, 20-24s-26e, in the Richgrove area of Tulare County, was in schist at total depth and an electric log of the well failed to show any oil prospects. Humble currently has one other test under way in the state. This well, the 1 Wayside Honor Farm, 1-4n-17w, in the Castaic area of Los Angeles County, is being drilled in conjunction with the British-American Oil Producing Co. and at last reports was going ahead below the 4,900-ft. mark.

CALIFORNIA WILDCAT FAILURES

Kern County, Kern Bluff area: Gene Reid Exploration Co. 3 Muir, 18-29s-29e, dry, elev. 760 ft., TD 1,171 ft.

Mount Poso area: Sunset Oil Co. 27-1 Sunset, 27-26s-28e, dry in gray Vedder, elev. unknown, TD 1,102 ft.

Round Mountain area: A. E. Bender 1 Yosemite, 16-28s-28e, dry, elev. 1,052 ft., Vedder 3,538 ft., TD 3,569 ft.

Tejon area: Steele Petroleum Co. 1 Tejon, 14-11n-18w, dry in granite, elev. 1,090 ft., TD 1,047 ft.

Temblor area: B. F. DeLanty 3-31-1 DeLanty, 31-29s-21e, dry in gray sand, elev. 1,581 ft., TD 1,728 ft.

Kings County, Lemore area: George F. Getty 1 Grangeville Comm., 27-18s-20e, dry, elev. 227 ft., TD 9,005 ft.

Monterey County, San Ardo area: Independent Exploration Co. and Oceanic Oil Co. 2 Thurman, 33-21s-9e, dry in basement, elev. 635 ft., TD 2,212 ft.

Orange County, Fairview area: Standard of California 1 Turley, 4-6s-10w, dry, elev. 75 ft., TD 7,275 ft.

San Luis Obispo County, Cuyama Valley area: Bandini Petroleum Co. 2 Graham, 33-11n-26w, dry, elev. 2,640 ft., TD 2,612 ft.

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Richfield Oil Corp. 1 Schlaudeman, 23-11n-28w, dry, elev. 1,836 ft., TD 3,234 ft.

Tulare County, Richgrove area: Humble Oil & Refining Co. 1 DiGiorgio, 20-24s-26e, dry, elev. 400 ft., TD 5,119 ft.

Sunnyvale area: Jergins Oil Co. 84-1 Calif. Grape Land Co., 17-23s-26e, dry, elev. 362 ft., TD 4,398 ft.

Visalia area: Miles Andrews 1 Carter-McCallister, 16-18s-25e, dry, elev. 353 ft., TD 1,765 ft.

OKLAHOMA

New Pay Formation For North Alma Pool

NORTH ALMA POOL has a new pay zone in the process of being tested at J. E. Crosby and Warren Oil Corp. 2 Pickens, SE NE NE 9-1s-4w, in the north extension of the pool. Well was drilled to a total depth of 5,668 ft. but when the normal Pennsylvanian sand pay for the field failed to be commercially productive, operator plugged back to 4,986 ft. and set casing at 4,938 ft. Pay at 4,940-80 ft. was shot with 130 qt. Well flowed the load oil and then flowed 90 bbl. in 2 hours. The oil is 32° gravity compared with 27°-gravity oil from the other producing wells of the field. The 2 Pickens is an offset to the recently completed Crosby 1 Pickens that made 172 bbl. from sand at 5,482-5,520 ft.

The Kingfisher County wildcat, Superior Oil Co. 1 Long, SE SE SE 16-17n-7w, flowed 56 bbl. of distillate on a 7½-hour test of the dolomite at 8,565-8,640 ft. During the test the chokes were varied from 9/64 in. to 20/64 in. On a previous test of the Hunton, the well flowed 92 bbl. of distillate in 15 hours from perforations at 8,050-80 ft.

Shell Oil Co. 1 Long, C NE SW 15-10n-21w, wildcat in the Elk City area of Beckham County, has another gas-distillate zone at 9,559-96 ft. On a 3-hour test, gas showed in 45 minutes, rated at 708,000 cu. ft. per day through ½-in. choke. Crew pulled 7,000 ft. of drill pipe and the well unloaded with a recovery of 810 ft. of distillate and 120 ft. of gas and distillate-cut mud. The datum of the new pay, calculated from an elevation of 1,983 ft., would be —7,575-7,613 ft. This is lower than the oil zone in the discovery well, Shell 1 Walter in Section 14, but above the gas-distillate zone at Union Producing Co. 1 Music in Section 25.

Sinclair Prairie Oil Co. has a good well at the northwest edge of Southwest Antioch field. The well, 1 McWhirter, NW SW NE 12-3n-3w, Garvin County, flowed 1,113 bbl. in 24 hours from perforations at 6,660-65 ft. and 6,680-99 ft. Gas was gaged at 1,267,000 cu. ft.

Casing is being set at the Pottawatomie County wildcat, Earl Sadler et al 1 Gaddy, NW NW SE 21-10n-2e, following good results from a drill-stem test of the first Wilcox. The Wilcox was called at 5,984 ft. and a drill-stem test at 5,984-6,004 ft. had gas in 7 minutes and flowed oil estimated at 72 bbl. per hour. The well is a little less than 1½ miles southeast of West Shawnee Lake pool.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: New pay in Sholem Alechem—Seaboard 2 Carpenter, SE SW SW 11-2s-3w, pumped 10 bbl. of 24°-gravity oil per day from sand at 3,558-72 ft., TD 7,488 ft.

Grady County: Northeast Bradley pool opener—Gulf 1 Mainka, NW NW NE 12-5n-5w, flowed 464 bbl. of 46.5°-gravity oil plus 10,000,000 cu. ft. of gas per day from third Bromide sand at 13,137-13,250 ft., TD.

Hughes County: Extension to Calvin—Deardorf 1 Jo Anne, SE NE NW 8-5n-10e, pumped 200 bbl. of 40°-gravity oil per day from Viola at 5,505-15 ft., TD 5,665 ft.

Seminole County: Halliburton 1 Kiker, NE NE SE 20-10n-7e, pumped 30 bbl. of 39°-gravity oil per day from Gilcrease sand at 3,690-3,700 ft., TD 3,810 ft.

OKLAHOMA WILDCAT FAILURES

Caddo County: Featherstone 2 Williams N/2 NW SE 12-5s-13w, dry, TD 1,665 ft., sand 1,360-70 ft., fusilinid 1,615-19 ft.

Gulf 1 Lawrence, C SW SE 21-7n-9w, dry, TD 11,615 ft., no tops reported.

Garvin County: Anderson 1 Neal, NW NE NW 9-2n-2w, dry, TD 7,174 ft., Checkerboard 6,138 ft., Deese 6,153 ft., first Deese sand 6,354-78 ft., broken Deese sand 6,363-6,438 ft., tight shaly Gibson sand 6,697-6,745 ft., basal Pennsylvanian-Woodford 6,825 ft., Hunton 7,026 ft.

Kay County: H. E. R. Drilling Co. 2 Henke, NE NW SE 31-25n-1w, dry, TD 4,335 ft., sand 4,120-35 ft., lime 4,135-96 ft., black shale 4,196-4,207 ft., shale 4,230-69 ft., lime 4,277-95 ft., chert 4,295-98 ft., shale 4,298-4,311 ft., lime 4,311-35 ft.

McClain County: Mid-Continent 1 Wilkins, C NW SE 32-5n-3w, dry, TD 10,125 ft., no tops reported.

Pottawatomie County: Dempsey 1 Mohrbacher, NW NW SE 3-9n-4e, dry, TD 4,542 ft., Avant 2,095 ft., Layton 2,678 ft., Checkerboard 2,927 ft., conglomerate 2,965 ft., Wewoka lime 3,108 ft., Wewoka sand 3,155 ft., Oswego 3,647 ft., Calvin sand 3,705 ft., Verdigris 3,916 ft., Skinner 3,935 ft., Inola 4,236 ft., Woodford 4,306 ft., Hunton 4,400 ft. with a show of oil, Viola 4,528 ft., with a show of oil.

Seminole County: Berry 1 Whitney, NE SE SW 16-6n-7e, dry, TD 1,925 ft., Hogshooter 482 ft., upper Calvin 1,335 ft., lower Calvin 1,458 ft., Senora lime 1,764 ft.

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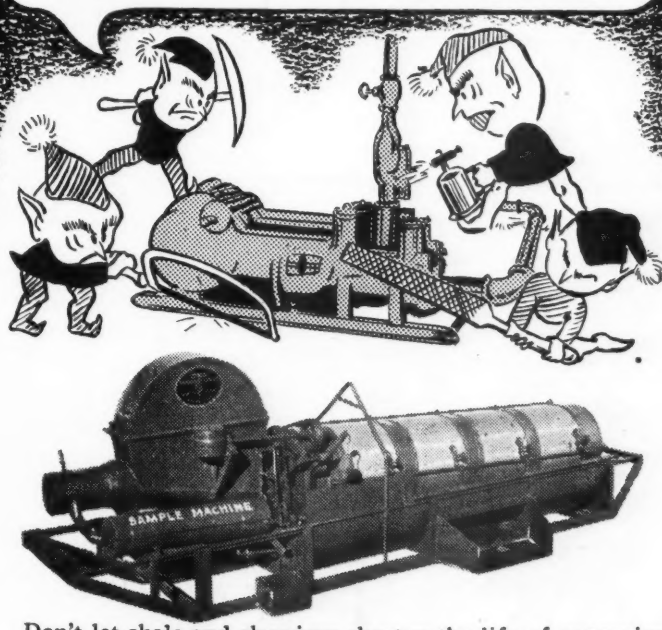

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OHIO, KENTUCKY

Wayne County Test Gets Clinton Gas

COLUMBUS.—The Ohio Fuel Gas 1 John B. Kline, Section 17, Congress Township, Wayne County, missed the Newburg sand and was drilled on down to the Clinton. Sand was found at 3,029-44 ft., and gaged 1,130,000 cu. ft. of gas natural, which will probably be tubing without shooting.

The Preston Oil 1 Ella Blue, Section 7, Jackson Township, Knox County, a north offset to the 1 Darling in the Bladensburg pool, found the Clinton at 2,894-2,929 ft., with a good showing of oil. After shot, 112 bbl. were swabbed in 24 hours.

The Fairfield Drilling Co. 2 Geo. Mavromatis, Section 15, Madison Township, Perry County, has been drilled 25 ft. in the sand and is showing 850,000 cu. ft. of gas natural.

The Morgan Petroleum Co. has been active recently in Washington County and with some success. Their 1 C. P. Shapley, Section 31, Grandview Township, tapped what is probably one of the Salt sands at 1,155 ft., and finished at 1,164 ft. with 1,100,000 cu.. ft. of gas natural.

Fox & Talbot have started drilling a wildcat shale test on the Ellis tract in Section 35, Rome Township, Lawrence County. Pico Oil Co. has a wildcat started on the Wm. Armintrout in Section 17, Scioto Township, Pike County.

Locations from 15 counties totaled 23 for the week, Ashland, Stark and Perry having 3 each, and Knox and Monroe 2 each. Ashland field led in completions with 8 out of 27.

OHIO WILDCAT FAILURES

Ashland County, Troy Township: E. A. Fierbaugh et al 1 Elizabeth Richards, Lot 7, no Clinton, dry, TD 2,500 ft.

Stark County, Washington Township: Stark Oil & Gas Co. 1 George Wallace, Section 25, Clinton 5,300-92 ft., dry, TD 5,496 ft.

EASTERN KENTUCKY

ASHLAND.—On Caney anticline in southern Morgan County, Sam Allen et al 1 Thomas Richardson, 12-P-65, were drilling at 4,250 ft. with no Knox dolomite reported as yet. Operators now have better than 1,400 ft. of open hole, last string of casing having been run at 2,812 ft.

Along the Powell-Wolfe County line, Raven Rock Petroleum Corp. (Chas. E. Ledford et al) of Winchester, Ky., have extended production to the northeast in the old Pilot oil field. To date eight producers have been completed with initial potentials reported from 15 to 200 bbl. per day. Only one dry hole has been drilled. Seven wells are in the process of being drilled. Pay is the Corniferous limestone, the top of which is found at approximately 1,200 ft., and wells bottom at about 1,250 to 1,300 ft.

EASTERN KENTUCKY WILDCAT FAILURE

Menifee County: Willett Groover et al 1 Motley, 21-R-72, dry, TD 3,212 ft., Knox dolomite 3,170 ft., water.

WESTERN KENTUCKY

OWENSBORO.—The Kentucky deep test about 1¼ miles southeast of Sebree in Webster County is drilling below 4,129 ft. The well, Pure Oil Co., Ashland Oil & Refining Co., and I. B. Browning 1 M. L. Walker, 22-N-24, is again drilling with rotary tools and is scheduled to go to 7,500 ft.

In the North Tunnel Hill section of Henderson County, Atlas Drilling Co. is preparing to set casing at 1 H. H. Poole, 24-O-23. On last report, operator was drilling below 1,785 ft. and planned to go to 1,800 ft. before setting pipe.

In the Griffiths pool of Daviess County, J. Akers et al 1 J. Bosley, 14-P-28, has been completed in the Jackson sand with an initial pumping production of 110 bbl. per day. The pay is at 1,503-30 ft. and total depth is 1,533 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

McLean County: J. C. Miller and Ashland Oil & Refining Co. 1 J. D. Bennett, NW SW SW 6-N-27, IP 240 bbl., Cypress 1,970-84 ft., TD 1,994 ft. (discovery well for Wyman pool).

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: Harlan Park Drilling Co. 1 Joan Calloway, SW SW SW 1-Q-30, dry, TD 820 ft.

INDIANA

EVANSVILLE.—The north extension of Martin pool in the northwestern part of Vanderburgh County is developing rapidly. George & Wrather 5 Reiman, NW SE SW 30-4s-11w, has been completed in the Cypress at 2,194-2,209 ft. with an initial production of 140 bbl. per day. Tidewater Oil Co. 1 Adler, NW SW SE 30-4s-11w, had an initial production of 326 bbl. per day and Ryan Oil Co. 4 Brune, NE NE NW 31-4s-11w, pumped 275 bbl. per day. This area was opened early in October by George & Wrather 1 William Reiman, SW SE SW 30-4s-11w.

The Vanderburgh County wildcat, A. B. Potter 1 Robert Mahrenholz, SE SW NW 16-7s-11w, southwest of Evansville, continues to hold the interest of operators in the area as crew prepares to drill plug for a test of the Waltersburg at 1,648-51 ft. A drill-stem test of the zone recovered 50 ft. of oil and 70 ft. of oil-cut mud.

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Pat. Pend.
High pressure on single stage developing at 3500 RPM.

CHECK THIS PERFORMANCE RECORD

3 GPM 90 lbs.	Total Head in Feet...	200
4 GPM 75 lbs.	Total Head in Feet...	175
5 GPM 60 lbs.	Total Head in Feet...	135
6 GPM 40 lbs.	Total Head in Feet...	100
8 GPM 30 lbs.	Total Head in Feet...	70

12 GPM Open pressure

Frank MATHEY
MACHINE WORKS
Inc.
114 So. Elgin Phone 2-9375
Tulsa, Oklahoma

INDIANA WILDCAT FAILURES

Clay County: H. A. Seipman 1 T. Fitch, SE SW NE 9-9n-7w, dry, TD 1,891 ft.

Gibson County: George Schoonmaker 1 C. Ingrum, NW NW SE 13-3s-9w, dry, TD 1,007 ft.

George & Wrather 1 E. Mickel, NE NW SW 26-1s-10w, dry, TD 1,339 ft.

Owen County: Texas Co. 1 H. D. Jean, SW NE SE 23-9n-5w, dry, TD 2,560 ft.

Sullivan County: C. W. Dittman 2 Campbell, SW SW SE 16-8n-10w, dry, TD 2,729 ft.

Perry Fulk 1 C. E. Sharpe, NW NW SE 8-9n-8w, dry, TD 2,135 ft.

Vigo County: F. B. Cline 1 Hazelton Heirs, SW SW NW 12-11n-9w, dry, TD 1,894 ft.

James Graham 1 L. Downey, NE NW NE 26-11n-9w, dry, TD 1,930 ft.

ILLINOIS

Saline County Wildcat Has Good Oil Show

MATTOON.—In the area about 3 miles north of Eldorado, G. C. Schoonmaker is testing Tar Springs sand at 1 Pemberton-Parks, SE SE SW 33-7s-7e, Saline County. A drill-stem test at 2,280-85 ft. with tool open for 1½ hours recovered 2,040 ft. of gas, 60 ft. of oil, 30 ft. of oil-cut mud, and 60 ft. of oil and gas-cut mud. Closest production is in Eldorado pool in 6-8s-7e, where the pay is also in the Tar Springs.

In Richland County, J. W. Everhart has set casing for a McClosky test at 1 Slichenmyer, SW NE NW 21-3n-10e. A 1-hour drill-stem test at 3,110-26 ft. recovered 1,800 ft. of gas and 280 ft. of oil-cut mud. Casing was set at 3,105 ft. and total depth is 3,220 ft.

National Associated Petroleum Co. has set casing and is testing the Trenton at a rank wildcat in Perry County. The well, 1 J. A. Ernest, NE NE NE 23-4s-4w, is reported to be swabbing about 12 bbl. per day from pay at 3,640-3,715 ft. Total depth is 3,735 ft. with casing set at 3,640 ft.

In the North Maud pool area of Wabash County, Calvert & Willis, Inc. 1 Bernard Wirth, SW SW NW 21-1s-13w, has a good show in Benoist sand. Operator has set casing at 2,554 ft. for further tests. Total depth is 2,616 ft.

The deep Jackson County test, Lambert 1 Hagler, SE NW SW 28-10s-2w, about 10 miles south of Murphysboro, is drilling below 1,650 ft. in the Mississippian. The well is scheduled as an Ordovician test or about 4,300 ft.

ILLINOIS WILDCAT FAILURES

Bond County: Joe Kesl, Jr. 1 Dank Brothers Coal & Coke Co., SW SE NW 17-5n-4w, dry, TD 766 ft.

Clay County: Phillips Petroleum Co. 1 Beare, NW SE NW 5-4n-5e, dry, TD 2,785 ft.

Phillips Petroleum Co. 2 Frost, NE NW SE 4-3n-6e, dry, TD 3,044 ft.

Hamilton County: Phillips Petroleum Co. 1 Travis, SE SW NW 8-5s-7e, dry, TD 3,542 ft.

Phillips Petroleum Co. 1 Osburn, SW SW NE 7-7s-5e, dry, TD 3,415 ft.

Madison County: Joe Kesl, Jr. 1 G. Engelke, SW NW NE 31-6n-6w, dry, TD 695 ft.

George Cossens 1 Carl Engelke, SE NE NE 1-5n-7w, dry, TD 808 ft.

Marion County: E. H. Kaufman 1 Jameson, NW NW SE 26-3n-3e, dry, TD 3,112 ft.

W. H. Krohn 1 M. King, NW NW SE 32-1n-4e, dry, TD 2,994 ft.

Jasper County: Shulman Brothers 1 J. Harding, SW NW NE 14-5n-10e, dry, TD 2,928 ft.

Union County: Ohio Oil Co. 1 T. R. Cross, NW NW NE 21-13s-2w, dry, TD 1,500 ft.

Wayne County: Nation Oil Co. 1 H. Koontz, SE SW SW 8-2s-8e, dry, TD 3,379 ft.

Frank Lacy 1 F. Stankey, SW NE SE 3-3s-5e, dry, TD 3,364 ft.

Shelby County: Talbot Oil Co. 1 C. E. Engle, SW SW SE 20-10n-5e, dry, TD 2,029 ft.

CANADIAN FIELDS

Western Canada Gets Two Oil Prospects

CALGARY.—The Hanna-Craigmyle area, 90 miles northeast of Calgary, came into the limelight in the west Canadian oil picture this week with discoveries indicated at two wildcat wells testing separate structural features 16 miles apart. How important the new oil strikes are will be determined after the wells have been completed, further tested and follow-up drilling has been carried out.

Socony-Vacuum Exploration Co.'s Craigmyle 1, LSD 12, 32-32-16w4, is a discovery in the upper part of the Madison limestone. During a drill-stem test at around 4,050 ft. (interval not specified), a flow of 34°-gravity crude oil reached the surface in 18 minutes. The well was allowed to flow for 10 minutes before being killed. The maximum natural gas flow rate during the test was 350,000 cu. ft. daily. When the pipe was pulled, there was a 1,080-ft. column of gassy crude oil, with no formation water evident. The well is now coring below 4,222 ft. to test all horizons down to and including the Devonian.

Hanna Petroleums, Ltd., has the other indicated oil discovery at its Pete 1, LSD 14, 5-31-14w4, a mile southwest of the town of Hanna and 16 miles southeast of

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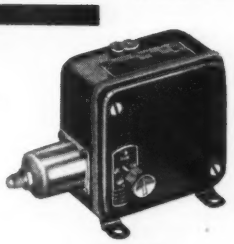

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Socony's venture. Commercial oil production was indicated at a depth of 3,716 ft. in the Sunburst section of the basal Cretaceous. Drill-stem test of the interval at 3,704-16 ft. gave an estimated natural gas flow rate of 55,000 cu. ft. daily, gradually diminishing but continuing throughout test. Pipe recovery during the 97½-minute test consisted of 1,680 ft. of oil, no water. Gravity of the oil was recorded as 32.7°. The Hanna discovery is now coring in what is believed to be the Banff formation at 3,750 ft.

Leduc-Woodbend.—Two new wells were assured successes this week in the Lower Cretaceous field northeast of Leduc. The two recent completions are ¼-mile north offsets on the ½-mile long strip of previous Lower Cretaceous producers. The pool, now with five producers, is located about 2 miles northeast of Leduc's Devonian oil field, and about 2½ miles east of the Woodbend Devonian oil field. Continental-Leduc-Woodbend 5, LSD 14, 7-51-25w4, confirmed its success in drill-stem test of interval at 4,214-25 ft., when oil flowed to the surface 18 minutes after test was opened. The well was allowed to flow for an additional 12 minutes, and produced oil at an estimated rate of 100 bbl. hourly.

The other success, Central Leduc Oils 7, LSD 15, 7-51-25w4, had a flow of oil 10 minutes after tester was opened in drill-stem test of interval at 4,152-59 ft. The test gave a natural gas flow rate of 782,000 cu. ft. daily.

Both the Continental Oil Co. of Canada's completion and the Central Leduc success are scheduled to run string of casing and go on production in the immediate future.

McConset-Leduc 1, LSD 16, 13-50-27w4, southwest Leduc extension effort, looks like a failure in the D-2 zone of the Devonian. Drill-stem test of interval at 5,178-90 ft. gave a recovery of 1,200 ft. of oil-cut mud and some salt water. Previous D-2 zone tests, higher in the section, gave only small shows of oil and gas, the formation apparently being too tight to yield commercially.

Redwater.—The Anglo-Canadian Oil Co. and Home Oil Co. commenced drilling at their first joint well on a half section of Crown Reserve lease acquired at Redwater. The well, Anglo-Home-Redwater 1, is located in LSD 16, 36-57-22w4. The combination's second well, Redwater 2, LSD 15, 36-57-22w4, is rigging up and is expected to spud in the next few days. Meanwhile, it was learned that the Anglo-Home team is working on plans to put an additional two rigs to work on the Redwater property. Details will be forthcoming shortly.

Imperial Oil's Redwater operations are as follows: Redwater 3, LSD 9, 11-57-21w4, is drilling at 2,898 ft., with about another 100 to 200 ft. to go before expecting its Devonian objective. Redwater 4, LSD 3, 14-58-22w4, is coring at 4,368 ft. Redwater 5, LSD 9, 25-57-22w4, is drilling below 837 ft.

Barrhead.—The Stanolind - Imperial Oil joint venture near Barrhead, LSD 15, 10-57-5w5, recovered salt water in drill-stem test run in the Viking sand from 3,366-83 ft. The well, Barrhead 1, will continue testing formations down to and including the Devonian. Current depth is at 3.794 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are on the known geologic structure of the Iron Creek field, Wyoming, and are offered in the following parcels all in T. 32 N., R. 82 W., 6th P.M.: Parcel No. 1, sec. 2, NW¼SW¼; sec 3, SE¼; sec. 10, W½NE¼, 280 acres. Parcel No. 2, sec. 11, W½SE¼; sec. 14, W½NE¼, NE¼NW¼, 200 acres. Total 480 acres. A stipulation for the protection of the Kendrick Reclamation Project (Form 4-467c), a copy of which may be obtained from the District Land Office at Cheyenne, or the Bureau of Land Management, Washington 25, D.C., will be made a part of any lease covering Parcel No. 2. Bids must be submitted on or before 1 p.m., December 22, 1948, and must be submitted on each parcel separately, but no objection will be made to the award of both parcels to the same successful bidder. Marion Clawson, Director.

Permian Basin

(Continued from page 148)

½-in. choke, Reef lime 6,260-6,412 ft., TD 6,419 ft., elev. 2,419 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Andrews County: Mid-Continent Petroleum Corp. 1 University "12," Sec. 33, Blk. 12, University Lands, 20 mi. SW Andrews, dry, TD 7,301 ft., Glorietta 5,670 ft., Clearfork 5,920 ft., elev. 3,272 ft.

Concho County: The Texas Co. 1 Lindeman, Sec. 20, SPRR Sur., 2½ mi. NE Eola, dry, TD 4,795 ft., Ellenburger 4,318 ft., elev. 1,748 ft.

Crockett County: A. W. Adkisson 2 V. B. Cox, Sec. 40, Blk. ST, E. Foster Grantee, 1,320 ft. E of 1 Cox, dry, TD 1,200 ft., lime with saturation 1,072-76 ft.

Gar-Ter Drilling Co. and Standard-Fryer 1 Weiner-Shannon, Sec. 16, Blk. UV, GC&SF Sur., 5 mi. E Todd (deep) field, dry, TD 7,980 ft., Clearfork 3,390 ft., Ellenburger 7,785 ft., elev. 2,629 ft.

Gulf Oil Corp. 1-E University C-C-C, Sec. 5, Blk. 51, University Lands, 15 mi. S Big Lake, dry, TD 10,288 ft., Silurian 9,400 ft., Ellenburger 9,695 ft., elev. 2,620 ft.

Garza County: R. D. Hawn 2 K. Stoker, Sec. 53, Blk. 5, GH&H Sur., 5 mi. SE Post, dry, TD 2,952 ft., San Andres 2,220 ft.

Sterling County: Amerada Petroleum Corp. 1 Carrie McDonald, Sec. 3, Blk. T, T&P Sur., 4 mi. SW Sterling City, dry, TD 8,535 ft., Clearfork 2,020 ft., Wolfcamp 4,370 ft., Ellenburger 8,486 ft., elev. 2,482 ft.

Tom Green County: Humble Oil & Refining Co. 1 H. R. Wardlaw, Sec. 863, H. Speier Sur., 5 mi. N Tankersley, dry, TD 7,368 ft., Ellenburger 6,905 ft., elev. 2,022 ft.

Ward County: C. H. Murphy Co. 1 Cooper, Sec. 139, Blk. 34, H&TC Sur., dry, TD 5,144 ft., Delaware lime 5,075 ft., sand 5,112 ft., elev. 2,679 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Humble Oil & Refining Co. 1 Gorman-Federal, 30-15s-22e, wildcat 12 miles northeast of Hope, in Chaves County, was drilling ahead in dolomite and hard sand at 5,750 ft. It was believed to be in the Ellenburger. A 1-hour drill-stem test from 5,550-5,600 ft. produced a strong blow of air throughout and recovered 2,250 ft. of salt water.

Eddy County.—Resler Oil Co. and Malco Refineries, Inc., had moved in to clean out at 1 King-State, 16-19s-27e. The well was drilled to the San Andres at 2,003 ft. in 1945. Location is about 1 mile east of McMillan Lake. Magnolia Petroleum Co. 1 Golden, 29-21s-22e, was drilling at 2,293 ft.

Lea County.—Magnolia 1 Cox-Federal, 1-9s-36e, was running casing. Total depth was 6,200 ft. Magnolia's 1 Yates-Federal, 31-9s-36e, was testing perforations at 4,830-45 ft. Amerada Petroleum Corp.'s 1-C-A State, 9-10s-36e, new 12,500-ft. test 3¼ miles southwest of Crossroads discovery, was drilling below 4,210 ft. Amerada's 1 J. R. Hamilton, 35-16s-38e, was below 7,440 ft. Planned depth is 12,000 ft.

Two miles northeast of production in the Eunice-Monument area, The Texas Co. 1 McMillan, 3-19s-37e, was drilling below 5,890 ft. A drill-stem test at 4,392-4,428 ft., open 1 hour and 45 minutes, recovered 320 ft. of oil and gas-cut mud, plus 40 ft. of sulfur water. A second test at 4,510-30 ft. recovered mud with no shows.

Stanolind 1-U State, 2-20s-38e, was drilling ahead below 9,245 ft. Continental Oil Co. 1-B-29, 29-20s-38e, was drilling in dolomite at 8,249 ft. Top on the dolomite was 7,860 ft. East of the Drinkard field, Edna May Elliott 1 Keinath, 8-21s-38e, set 7-in. liner at 3,295-7,553 ft. and prepared to clean out and test the lower Permian. Old total depth of the wildcat was 9,954 ft., in the pre-Cambrian.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Eddy County: S. P. Yates 1-D State, SE SE SE 24-18s-27e, about 2 mi. E Artesia field, flowed 50 bbl. of 36°-gravity oil a day, sand pay 1,985-2,022 ft., TD 2,097 ft., elev. 3,566 ft.

LEGAL

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Expert Criticizes FTC For Basing-Point Stand

(Continued from page 59)

distant competitors, because of his advantage of location. But what about the seller's advantage of location? Is he to be denied the right to exploit his own advantage of location as to some of his customers and to try to offset his disadvantage of location as to other customers?

The commission's October 12, 1948, statement of policy concludes that virtually all pricing systems, other than f.o.b. mill, are discriminatory and that they are illegal whenever those discriminations may be found to injure competition.

But the commission expressly avoids giving any yardstick by which the legality of any pricing system may be determined. Its philosophy is that the commission must be free to judge the legality of each case, on the individual facts in that case, after litigation before the commission.

Position Not Clear

That statement of policy concedes that the legality of pricing systems is crucially affected by the idea of what constitutes injury to competition through discriminatory varying mill net prices. But as to what is injury to competition, the commission says that at one extreme there would appear to be no injury until substantial numbers of people had become bankrupt, and that, at the other extreme, injury to competition might be found in any case in which there was a price difference, no matter how insignificant, between competing customers. The commission does not indicate at which of these extremes or at what point between them it will fix the existence of injury to competition.

Thus at a maximum, f.o.b.-mill selling is required in virtually every American industry, and at a minimum a seller can never know in advance of litigation with the commission whether any pricing practices, other than f.o.b.-mill selling, is legal. It thus seems clear that any seller, in an industry where freight is a substantial part of the delivered cost, can only sell with assurance that his pricing system is legal if he employs a uniform f.o.b.-mill price.

At the public hearings of the Senate trade policies committee, three of the principal attorneys for the Federal Trade Commission have confirmed that conclusion and have testified that the only safe and certain way of selling commodities with assurance that the pricing practice employed is legal, is to sell at f.o.b.-mill prices.

Billions of dollars of the money of American people have been invested in industrial facilities and railroad properties in the belief that uniform delivered prices and freight equalization was both morally and legally proper. Many of these investments may be impaired by a pricing philosophy which requires only f.o.b.-mill selling. The owners of those investments complain that it is not fair to change the rules during the middle of the game.

It has been urged that f.o.b.-mill pricing may eliminate dealer competition in many commodities. For example, it is said that the cement dealer in a given community who purchases his cement from the closest mill will be able to buy at a lower price and thus have a substantial competitive advantage over other cement dealers in the same town. This may ultimately eliminate competition at the dealer level in commodities such as cement. This is particularly so when the nearby cement mill does not care to have more than one dealer in the town.

The manufacturer of any product made from minerals or farm produce acquires a substantial inbound freight advantage if he locates his plant close to the source of his raw materials. Those raw materials, however, are found only where nature placed them, and generally man has not chosen for the site of his large consuming areas the same sites chosen by nature for her deposits of natural resources.

Freight Absorption at Issue

It has never been questioned but that a manufacturer may absorb inbound freight costs. We must now determine whether the manufacturer with an inbound freight advantage may not be permitted to absorb outbound freight in order to compete with competitors located closer to the customers.

On November 18, 1948, the senior associate general counsel for the commission, who tried all these cases in the courts, gave illuminating testimony with respect to warehousing and trucking practices. He testified that a manufacturer who had a chain of warehouses throughout the country in local markets, could ship his products to those warehouses and absorb the full cost of transportation on such shipments. He further testified that these products or commodities could then be sold out of the warehouses at local prices which did not include the freight to the local market.

And in answering a hypothetical question, he testified that a competitor of that seller, located across the street from his plant if you please, who did not have such a chain of warehouses, could not sell his products in those distant local markets without charging the full freight to the local market, and that he could not regularly and customarily meet the local prices of the chain warehouses operator. Thus the ability to compete on a national basis may well depend on the seller's financial ability to build a chain of warehouses.

You will be further interested in his testimony that a seller who owns a fleet of trucks may legally consider transportation costs in those trucks as a cost of his doing business and is not required to charge the transportation cost to his customers. But a competitor, across the street if you please, and making the precisely same article, shipping into the same areas, through trucks of a common carrier, is required to charge the customer the full freight.

Thus, a seller's ability to compete in distant markets may well depend on whether he is financially able to purchase his own fleet of trucks.

Congress Should Decide

There may well be many economic advantages of uniform f.o.b.-mill selling. These advantages may well offset all of the disadvantages of f.o.b.-mill selling. But so important a change in our national economy should only be put into effect at the expressed direction of the Congress. It now appears that such pricing philosophy is being imposed upon industry under statutes designed largely to prohibit unfair price discrimination in favor of chain stores and to prevent unfair methods of competition largely in the form of false advertising.

The Congress must determine when, if ever, any seller is to be denied the right to compete for any business, in any market, with any competitor, under any pricing system including the absorption of freight, so long as he does not act pursuant to a conspiracy or agreement.

It seems clear that the Congress must determine what pricing practice will best promote our free-enterprise competitive system and put it into law in such clear language that businessmen who want to be law-abiding citizens may know what conduct is required of them to live within the law.

A.P.I. Groups to Study Deep Drilling Problems

HOUSTON.—Study groups to investigate the problems involved in drilling wells from 15,000 to 20,000 ft. deep have been formed by the local chapter of the American Petroleum Institute.

According to John M. Payne, study group chairman, four separate groups covering the following phases of deep drilling will be formed: prime movers and hoisting equipment, tubular goods, other equipment, and techniques. First meeting was November 17 and the schedule runs to March.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 4, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	23	11	0	*12	22,362	1,385	1,629	0	0	0	0	0	0	0	0	0	0
Pennsylvania	40	20	3	†17	70,104	2,368	2,925	0	0	0	0	0	0	0	9	14	23
West Virginia	17	4	12	1	42,021	771	824	0	0	0	0	0	3	0	37	43	83
Ohio	27	5	7	‡15	64,272	1,299	1,279	0	0	0	2	2	2	0	11	36	49
Indiana	32	17	0	15	57,763	1,040	616	0	0	0	8	8	27	0	1	94	122
Kentucky	20	10	2	8	32,884	747	689	1	0	0	2	3	10	0	0	41	51
Illinois	63	29	0	34	164,881	2,334	1,957	0	0	0	14	14	47	0	2	361	410
Michigan	21	12	1	8	47,481	823	853	0	0	0	7	7	18	0	10	252	280
Kansas	43	23	3	17	143,803	2,921	2,514	1	0	0	6	7	60	0	7	415	482
Neb., Mo., Iowa	0	0	0	0	0	9	5	0	0	0	0	0	0	0	0	7	7
Oklahoma	83	56	2	25	329,946	3,917	3,768	4	0	0	7	11	123	8	27	590	748
Texas	269	166	17	86	1,180,648	11,204	8,608	6	2	2	48	58	313	34	97	1,920	2,364
North Central (Dist. 7-B & 9)	91	51	1	§39	255,126	3,502	2,685	2	1	0	17	20	113	3	13	702	831
West (Dist. 7-C & 8)	58	44	2	12	294,725	2,989	2,108	2	0	0	9	11	65	1	6	220	292
Panhandle (Dist. 10)	15	11	4	0	50,865	608	445	0	0	0	0	0	1	0	3	11	15
Eastern (Dist. 5 & 6)	19	12	2	5	99,073	557	536	0	0	1	3	4	12	2	1	112	127
Gulf Coast (Dist. 2 & 3)	43	20	7	16	299,275	1,765	1,465	1	1	1	9	12	72	23	35	407	537
Southwest (Dist. 1 & 4)	43	28	1	14	181,584	1,783	1,369	1	0	0	10	11	50	5	39	468	562
Louisiana	48	29	2	17	266,332	2,162	1,506	1	0	1	7	9	46	25	9	203	283
Northern	32	22	1	9	124,219	1,453	892	0	0	0	3	3	4	4	2	102	112
Southern	16	7	1	8	142,113	709	614	1	0	1	4	6	42	21	7	101	171
Arkansas	0	0	0	0	0	279	306	0	0	0	0	0	6	0	0	84	90
Mississippi	10	6	0	4	66,593	387	454	0	0	0	2	2	4	1	3	91	99
Southeastern States	0	0	0	0	0	51	59	0	0	0	0	0	0	0	0	47	47
Montana	10	8	0	2	28,799	291	285	0	0	0	2	2	4	0	0	24	28
Wyoming	10	6	0	4	46,436	550	240	1	0	0	4	5	26	0	2	73	101
Colorado-Utah	2	2	0	0	12,927	211	198	0	0	0	0	0	3	0	5	45	53
New Mexico	9	5	1	3	32,053	553	497	1	0	0	1	2	5	1	3	52	61
California	63	48	0	15	246,993	2,673	1,882	0	0	0	13	13	114	1	5	327	447
Total United States	790	457	50	283	2,856,298	35,975	31,094	15	2	3	123	143	811	70	228	4,719	5,828
Total previous week	767	439	48	280	2,650,313	35,185	30,400	15	1	7	98	121	796	68	225	4,596	5,685
Total December 6, 1947	694	364	72	258	2,423,852			10	2	5	106	123	651	88	209	3,850	4,798

Service wells included: *12, †17, ‡1, §2.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Effective September 28, 1948, Phillips Petroleum Co. advanced prices 35 cents per barrel over those shown in above table in fields where it buys. Sinclair Prairie Oil Co. met Phillips' increase effective November 24 in all fields that it buys and extended price advance to some Rocky Mountain fields. Advances have not been generally met.

A.P.I. REFINERY REPORT, WEEK ENDED NOVEMBER 27

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	863	2,175	357	1,323	1,630	22,545	11,043	26,929	12,807
Appalachian:									
District 1	101	280	51	78	70	2,357	439	971	407
District 2	67	257	20	58	97	1,248	129	285	235
Ind., Ill., Ky.	972	3,229	488	977	1,124	19,527	4,767	13,154	6,138
Okla., Kans., Mo.	441	1,714	141	612	517	8,709	1,599	6,297	3,044
Inland Texas	255	1,060	99	183	478	3,386	716	1,259	1,333
Texas Gulf Coast	1,384	4,090	836	2,251	1,771	15,227	4,100	14,850	10,850
La. Gulf Coast	420	1,135	437	673	512	5,144	2,165	4,071	3,834
N. La. and Ark.	86	244	61	81	131	2,457	444	732	356
Rocky Mountain:									
New Mexico	15	54	7	12	28	67	25	55	35
Other Rocky Mt.	139	471	34	196	250	1,941	257	1,706	1,128
California	978	2,608	99	1,032	2,869	11,194	885	14,842	46,025
Nov. 27, 1948	5,721	17,317	2,630	7,476	9,477	93,802	26,569	85,151	86,192
Nov. 20, 1948	5,676	17,802	2,472	7,577	9,119	91,244	26,908	84,392	84,577
Nov. 29, 1947	5,309	16,667	2,324	6,382	8,405	86,319	20,619	61,988	56,747

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 234,585,000 bbl. as of November 27 —up 415,000 bbl. One year ago 224,540,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas‡	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°, †35° and above. ‡Phillips and Sinclair and other companies meeting 35-cent advance, $3.00.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

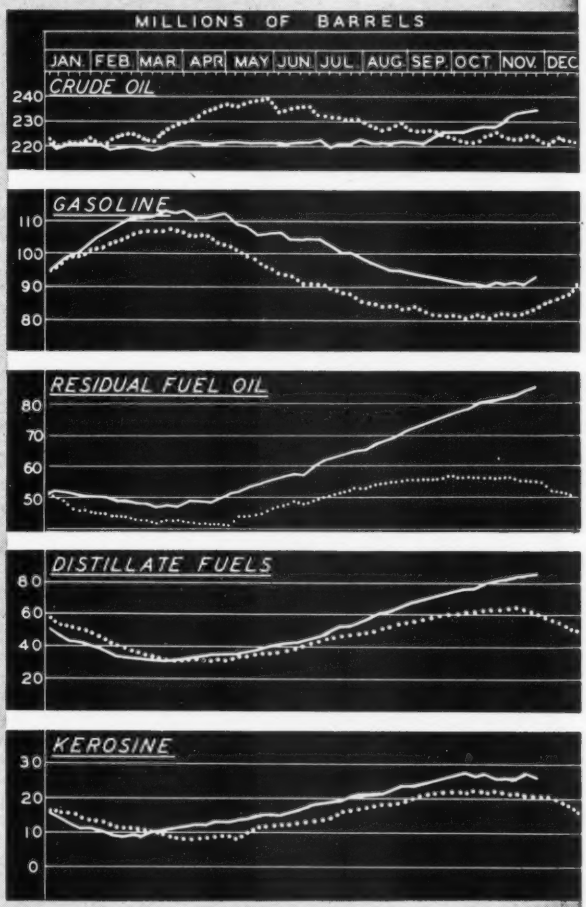
	Dec. 4 crude oil	B. of M. Nov. demand	Nov. 27 crude oil
Alabama	1,250	1,500	1,300
Arkansas	80,850	88,000	81,050
California	954,000	960,000	959,750
Colorado	48,150	48,000	49,430
Eastern	60,750	65,300	62,950
Florida	525	1,000	775
Illinois	178,700	167,000	179,600
Indiana	25,100	17,500	26,200
Kansas	291,800	306,000	283,400
Kentucky	24,100	23,000	24,400
Louisiana	492,200	500,000	492,450
North Louisiana	113,350	.....	113,800
South Louisiana	378,850	.....	378,650
Michigan	48,100	45,000	48,300
Mississippi	129,650	131,000	130,200
Montana	25,420	26,000	24,280
Nebraska	350	700	350
New Mexico	134,480	134,000	134,605
Oklahoma	443,000	436,000	442,400
Texas	2,519,175	2,460,000	2,523,850
Dist. 1 (Southwest)	27,800	.....	27,640
Dist. 2 (Southwest)	178,625	.....	177,900
Dist. 4 (Southwest)	252,275	.....	255,050
Dist. 3 (Gulf Coast)	503,600	.....	504,310
Dist. 5 (Eastern)	51,750	.....	51,775
Dist. 6 (Eastern)	124,875	.....	124,875
East Texas Field	292,650	.....	297,500
Dist. 7-C (West)	49,750	.....	48,825
Dist. 8 (West)	744,775	.....	746,825
Dist. 7-B (W. Central)	60,450	.....	57,925
Dist. 9 (N. Central)	143,700	.....	142,525
Dist. 10 (Panhandle)	88,925	.....	88,700
Wyoming	156,590	150,000	155,490
Total United States	*5,614,190	5,560,000	5,620,780
Change from prev. wk., dn.	6,590		

Total production January 1-December 4 †1,843,025,965 bbl.
Same period last year (crude plus cond.) 1,713,376,590 bbl.

*Not incl. 77,255 bbl. condensate. †Incl. 25,276,385 bbl. condensate.

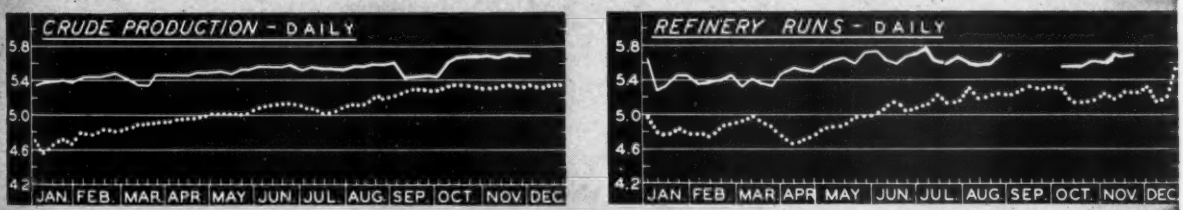
STOCKS IN UNITED STATES

---- 1947 ——— 1948



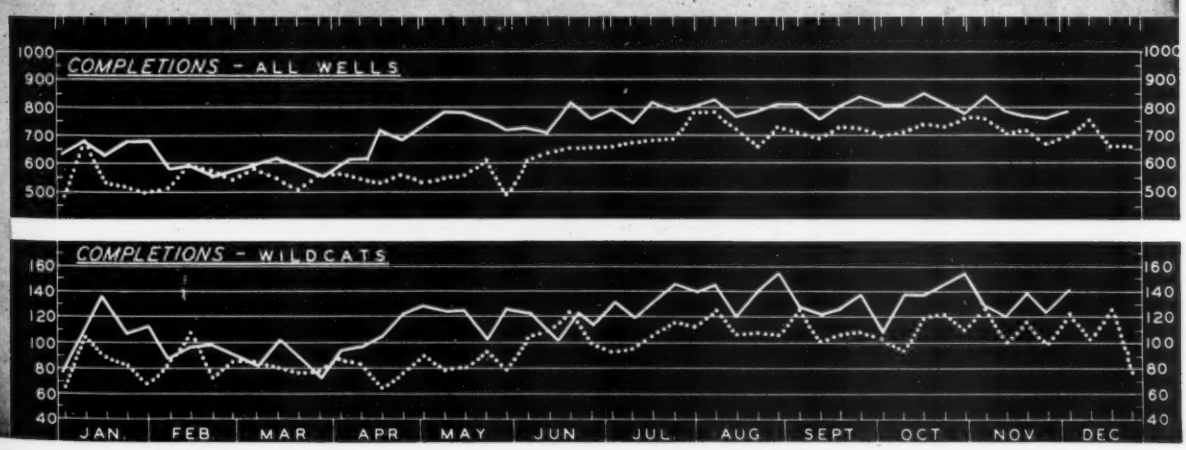
DAILY OPERATIONS

---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948



105 Pages of ideas on how to get more oil at less cost

Get this "Pack of Facts" to your Key Men Now

Up-to-date knowledge of how electricity is increasing production, cutting costs in the oil fields, is a must for your key personnel. Get the latest facts to them *now!*

IT'S EASY—General Electric has prepared all the facts in an easy-to-understand, absorbing, *visual* manner that gets ideas across fast.

Here's what the oil field electrification program offers:

1. A 105-page fact-packed manual, "Oil-Field Electrification," competently covering such subjects as power distribution systems, pipe-line pumping systems, and the selection of equipment for drilling and field pumping.

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3. A 12-page booklet which digests the many advantages electrification offers in the various drilling, well-pumping, and pipe-line operations.

Convince yourself first—

Examine the *Oil-Field Electrification Manual* free of charge. Use the coupon below.

SHOWINGS COST YOU NOTHING—With your manual, we'll tell you how to arrange for a FREE SHOWING of the film.

FREE TO BUSINESS MANAGEMENT

Attach to your business letterhead

General Electric Co.
Section D684-8
Schenectady 5, N. Y.

Please send me a sample copy of the G-E *Oil-Field Electrification Manual* (GES-3396) without cost, with details on how I can arrange a FREE SHOWING of the film. (Extra copies at regular manual price—$1.00.)

Name_____ Title_____

Company_____

Street_____

City_____

GENERAL ELECTRIC

MARKETS

THE weakening trend in the spot market for petroleum products continued last week throughout nearly all marketing areas. Gulf and Shell last week announced that they would meet Socony-Vacuum's new gasoline and fuel-oil price cuts throughout the New York and New England marketing area. Indications were that others would follow soon.

In the metropolitan area along the Eastern Seaboard increasing competition at the retail fuel oil markets prompted several independent dealers to report cuts in their retail prices even below Socony's new reductions.

The crude-price situation remained unchanged from most indications. Major company officials continued their stand of maintaining the present price levels. While rumor was that some buyers were steadily losing connections no buyers had yet indicated that they would meet the price advance.

While marketers generally were not concerned over the possibility of an imminent change in the pricing system of petroleum products as an outcome of the current Senate committee which is investigating industrial geographic pricing policies (basing point, freight absorption, and related pricing methods), interest was considerably stirred by the fact that testimony from oil-industry personnel was scheduled to be heard this week.

Mid-Continent Trading Soft

In the Mid-Continent area the weakening spot market in nearly all petroleum products continued. The published low quotations on spot tank-car lots were lowered last week on products from range oil on down. In the face of the generally weakening market and lowering price levels for petroleum products comment was widely forthcoming from marketers that they "couldn't see how a general crude-price increase could go through."

Kerosine, one refiner reported, was moving exceptionally well and that he was "cutting into storage" in order to meet the strong demand for this product. Prime white and water white was reported by most sources to be maintaining its firm demand and showing no evidence of slackening. One Oklahoma refiner reported that he had been moving considerable No. 2 at 9⅝ cents per gallon and that he was behind on shipments. These were contract shipments.

Though gasoline generally was said to be continuing "fairly firm" one refiner reported that he had a considerable amount of this material sold but that customers were not calling for it as they indicated it was moving slow. Shipments of housebrand were reported at 10⅛ cents per gallon and while the market for premium grade was not as active it was reported moving at about 1 cent above the house brand. With the recent 7 per cent increase in anti-knock compound refiners may be forced to raise their price of Ethyl by as much as ¼ cent per gallon, one refiner reported.

Gulf Coast

Trading in petroleum products in the Gulf Coast area remained fairly quiet during the past week. Nearly all products were readily available to buyers. Independents generally had met the reductions of prices. South Texas lubricating oils were reported as readily available. Only 100 viscosity pale and red oils indicated the least tightness. Pennsylvania Grade cylinder stocks continued their relatively easy price tone.

Representative Quotations

Representative spot-market quotations of leading suppliers as of December 6, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10¼-10½	11.8-12* 10.5-11.9†	10¼-11½
Premium gasoline, 78-80 octane	11-11¼	10.6-13.4	11-12¼
42-44 w.w. kerosine	9⅜-9¾	10.3-11.7	9½-10¼
No. 2 straw fuel oil	8¾-9½	9.1- 9.7	9-9½
No. 6 residual	$1.60-2.00	$2.83-3.05	$2.20-2.52

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	31-33
200 vis. No. 3 neutral, 0-10 pp.	19-21

Western Pennsylvania

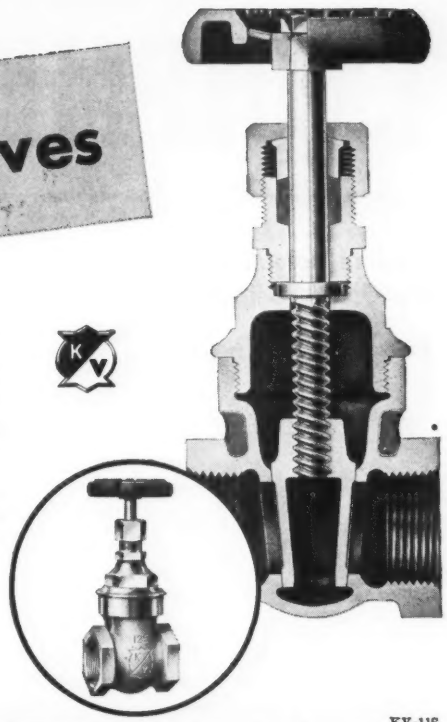
144-155 vis. 10 p.t. bright stock	40.5
180 vis. p.t. neutral	38.5

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	5½

KENNEDY
Bronze Gate Valves



Non-rising stem, inside rising stem, outside screw and yoke, and lever-operated valves in all standard sizes. Various types for pressures up to 300 lb. steam and 600 lb. water, oil or gas. Simple, sturdy designs with special features that assure easy and lastingly trouble-free operation.

The 240-page Catalog 63 describes in detail the entire Kennedy line of bronze and iron-body gate, globe, angle and check valves for all standard requirements, malleable iron and bronze screwed fittings, and cast iron flanged fittings and flanges.

Buy from your local Distributor

THE KENNEDY VALVE MFG. CO.
Elmira, New York
West Coast Offices: San Francisco, Los Angeles, Seattle

KV-115

KENNEDY *valves - pipe fittings - fire hydrants*

Guaranteed!
To Reduce Friction and Wear Or Double Your Money Back

ADDS LIFE TO YOUR ENGINES

- Greatly Reduces FRICTION—Penetrates and lubricates where Ordinary Oil Fails.
- FREES Sticky Valves.
- Keeps High Compression Engines FREE of gum, sludge and carbon binder.
- Helps increase Engine Power.
- Reduces fuel consumption.
- Prevents corrosion.

Add regularly to fuel and motor oil

HOBB SWETNAM CO., INC.
WICHITA FALLS, TEXAS

STOP COSTLY LEAKS...
find them with a FISHER
M-SCOPE LEAK DETECTOR

Why tolerate costly leaks in oil and water lines . . . or waste enormous sums in blind exploratory excavating to find those leaks? The

FISHER M-SCOPE MIDGET LEAK DETECTOR

is so sensitive that it can locate the exact trouble point with pin point accuracy even through concrete.

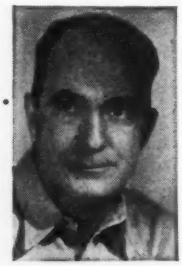
FREE BOOKLET
Write Dept. 1 today for 16-page catalog!

Fisher M-Scope Equipment from **$67.50** up

Fisher Research Laboratory, Inc.
PALO ALTO · CALIFORNIA

EQUIPMENT MEN ... in the News

Franks Selects Lamer For Sales Position



K. M. "Kenny" Lamer, former Odessa service manager for Franks Manufacturing Corp., has been appointed Franks sales representative for West Texas and New Mexico. His office will remain in Odessa, Tex. Lamer entered Franks service December 1, 1942, where he worked in the assembly shop and later was transferred to West Texas as service manager.

Rockwell Appoints Dixon Manager DuBois Division

L. A. DIXON, JR.

W. F. Rockwell, Jr., president, Rockwell Manufacturing Co., has announced the appointment of L. A. Dixon, Jr., as general manager of the Pittsburgh DuBois division of the company. Dixon started in the engineering department of Pittsburgh-DuBois and was made executive vice president in 1944. When Rockwell acquired the company in 1947 he became the assistant general manager. This division operates plants in DuBois and Sykesville, Pa.

Plague Presented Memory W. C. Trout of Lufkin

Lufkin Foundry & Machine Co., and fellow townsmen in Lufkin of Walter Charles Trout, late president of the company, recently dedicated a life-like bronze plaque to his memory.

Dedicatory remarks were offered by A. E. Cudlipp, president of the company. Others on the program were Rev. Harley Patterson, pastor, First Christian Church; Jesse Belote, who unveiled the plaque, and Rev. Ed Mulliner, pastor, First Presbyterian Church.

In his eulogy on Trout's life, Cudlipp referred to his devotion to the business he headed; to his interest in preserving the great American traditions; to Lufkin's memorial hospital, in the building of which, he was the prime mover; to his national, state, and local influence, and to his long and useful life.

Hugh Johnson Advanced By Alloy Steel Products

Alloy Steel Products Co., Linden, N. J., announces the appointment of H. E. Johnson as sales manager with headquarters at Linden. Johnson was former district manager of the Chicago office. He has specialized in valve engineering and sales having been with Crane Co., in Philadelphia and Chicago, and then with Edward Valves, Inc., in Chicago prior to joining this organization.

Koppers Appoints Robinson Division Sales Manager

Appointment of McMillan Robinson of Philadelphia as sales manager for the metal products division of Koppers Co., Inc., has been announced by Walter F. Perkins, vice president and general manager of the division.

Robinson, who resigned as vice president of Ocean City Manufacturing Co., Philadelphia, to accept the Koppers position, will be responsible for coordination of sales activities of the division, development of policies, methods, organization, promotional activities, advertising programs, and merchandising plans.

G. E. Opens Huge Plant in California

A $3,000,000 motor-manufacturing plant, which at peak production will be able to turn out more than 1,500 electric motors weekly, has been officially opened by General Electric Co. at San Jose, Calif.

The San Jose factory, situated on a 57-acre tract which allows for multiple expansion of the present building, ultimately will produce all of the company's output of single-phase capacitor integral motors.

At peak production, expected to be reached early next year, the plant will turn out more than 1,500 motors weekly.

Western Supply Names Emery Works Manager

W. A. EMERY

F. W. Dye, president of Western Supply Co., Tulsa, manufacturer of heat-transfer equipment, has announced appointment of Willard A. Emery as works manager. Prior to joining Western, Emery was assistant plant manager of Worthington Pump & Machinery Corp.'s Holyoke works. With this company he has also held the positions of sales service engineer, production manager, superintendent of welding and refrigeration, and assistant manager of ordnance division. Emery has served on the board of directors of the Western Massachusetts Technology Club, and on the advisory committee of the Holyoke Trade School.

Elliott Company Sends Willcox to Houston

J. D. WILLCOX, JR.

James D. Willcox, Jr., has just been appointed district manager of Elliott Co.'s Houston territory, according to an announcement by F. W. Dohring, vice president in charge of sales, Jeannette, Pa. Willcox came with Elliott in 1935 after graduation from Cornell University as an electrical engineer. From 1937 until his recent appointment, he was with the Atlantic district office, except for 3 years of service in the Navy during World War II.

Koppers Chemical Names Pottenger to Sales Post

Carl H. Pottenger, assistant manager of the plastics department of American Cyanamid Co. since 1947, has accepted a position as an assistant sales manager of the Chemical division of Koppers Co., Inc.

Pottenger formerly was a vice president of Pennsylvania Coal Products

(Continued on page 165)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: One 36-L Bucyrus-Erie Spudder, trailer mounted. Casing tackle equipment. Waukesha motor. Brand new. Latest model. Has never been used. Asking delivery price, no bonus. Telephone 166-J, Mt. Carmel, Illinois.

USED Fort Worth Spudder, size Super-D, first-class condition every place, including new bearings and chains throughout. Will spool 4000′ of ⅞″ wire line. Machine located Okfuskee County, Oklahoma. Inquire: Ingold, Room 1307, Philtower Bldg., Tulsa, Oklahoma. Phone 2-8095.

PIPE FOR SALE: 6,000′ 8″ 24# T & C, 22,000′ 7″ 17# O.D. Casing, 40,000′ 5½″ 14# O.D. Casing, 50,000′ 2″ 4.5# EUE-LW Tubing, 20,000′ 2″ 3.75# Line Pipe. The above pipe all single random lengths, located in West Virginia area, and is subject to buyer's inspection and prior sale. Goodman Pipe Corp., Box 257, Bradford, Pa., Phone 4169.

2 GASO Fig. 1743 5½″ x 10″ horizontal duplex, enclosed type, all Timken bearing piston power pumps, Factory rating 213 gpm @ 500 lb. @ 54 rpm, together with two drives including 75 hp., 2300 volt motors.

POTASH COMPANY OF AMERICA
P.O. Box 31, Carlsbad, New Mex.

FOR SALE

IMMEDIATE DELIVERY

NEW PLAIN HOT ROLLED, ANNEALED MILD STEEL SHEETS

*Approx. 200 TONS—12 ga. x 36″ x 96″

NEW HOT ROLLED MILD STEEL PLATES

* Approx. 50 TONS—¼″ x 5′ x 12′.
* Approx. 260 TONS—$\frac{1}{4}$″ x 5′ x 15′ & 20′
* Approx. 160 TONS—8 ga. x 5′ x 20′

CARBON = .12 max.

FABRIKANT
STEEL PRODUCTS, Inc.

50th Floor—Woolworth Bldg.
NEW YORK 7, N. Y. BEekman 3-3041
CABLE ADDRESS: FABKANT, NEW YORK
MEMBER Association of Steel Distributors

EQUIPMENT FOR SALE

FOR SALE: Oil Well Service Unit—Muskogee Model T Single Drum with Buda Model K428 Motor—Mounted on D-40 International Truck—45′ Telescope A Mast Ready for Work. ¾″ x 5000′ Line, ⅞ x 800′ Tubing Line, Few Tools, all for $3850.00. General Tool & Supply Co., P.O. Box 4387, Phone 6-1335, Oklahoma City, Okla.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Near Lyons, Kansas, string 4½″ drill pipe with tool joints, about 3,000′. Now a part of drilling rig. $2.00 per ft. Cities Service Oil Company, Mr. Patridge, Bartlesville, Oklahoma.

1—4,000′ POWER Rotary Drilling Rig complete with 87′ Moore Mast and Subbase. 2 EK Waukesha Motors with extension shafts (V-Belt), excellent condition. 6 x 16 Wilson Snyder Power Pump. 5 Drill Collars, Kelly, Etc. Will sell as one unit or separately. Phone 41213, Wichita, Kansas.

1—Ingersoll-Rand Steam Driven Compressor—Imperial Type XPV Duplex, equipped with plate valves, automatic oil governor, and overspeed stop. Compressor has been two-staged. Box C-693, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

EQUIPMENT FOR SALE

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6″ to 12″, excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

FOR SALE: 7 Twin and 5 Single Clark Horiz. Engine Compressor Units in Oklahoma. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

3000 ft. NEW 8⅝″ OD, Naylor Spiral Weld Pipe 40′ lengths, with Victrolic Couplings. A. A. Gilbert Pipe & Supply Co., Post Office Box 986, Shreveport, Louisiana.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

For Sale Emsco Mud Pump

Exposed liner type, Model C-12, Serial 213, size 7¼ x 12.

Mounted on skids equipped with suction and hose and 48″ V-belt sheave.

Extra gaskets, valves, seats, heads, rods, and 1 set of 7¼ Emsco liner and 1 set of 6¾ Emsco liner.

Pump is in good condition and is up for your inspection in our yard at Great Bend, Kansas.

Crown Oil Company, Inc.
Great Bend, Kansas **Ph. 3571**

FOR SALE—TWO STEEL PIPE MILLS

1—Manufacturers Seamless tubing from billets capacity to 6⅝″ O.D.

1—Resistance Weld Mill capacity to 6⅝″ O.D.
Suitable for manufacturing oil well casing.

Also—six 100 KW Diesel Generator Units

Priced to Sell

ARKO PRODUCTS CO.

546 Second Av., Detroit **WOodward 1-1894**

A RUGGED 7,500′ ROTARY RIG
VERY ATTRACTIVE PRICE

Powered by two **practically new** Le Roi 12-cylinder engines. 6700′ excellent 4½″ full hole drill pipe with drill collars. ● 18″ heavy duty slush pump. ● 300-ton hook and heavy blocks. ● Large swivel. ● 26″ oil bath rotary table. ● Vibrating shale shaker. ● Light plant. ● Butane tank. ● Tool house and tool box. ● Blowout preventer. ● Overshot. ● Casing tools. ● Complete accessories with many extras. Located in West Texas.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: New Steel Pipe—4" to 14". E. A. Tompkins Co., 2203 E. 28th St., Long Beach 6, Calif. Teleph. 4-5569.

A REAL BARGAIN!

50 LIGHTING PLANTS AT HALF PRICE

5 K.W. 120-VOLT D.C. DIRECT CONNECTED TO VE-4 WISCONSIN AIR-COOLED ENGINE

—with panel complete, mounted on steel skids. Metal weatherproof case. New equipment in original shipping cases, each with a set of maintenance tools and extra engine parts included.

SUBJECT TO PRIOR SALE — BY LOT OR INDIVIDUALLY

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THYLOX LIQUID PURIFICATION PLANT — Cap. 60 million cu. ft. per 24 hours. Complete. Like New. Installed 1942. Used 15 months.

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AUTOCLAVE — Jacketed, 6'0" x 8", vert., welded construction, 11/16" shell, stainless steel, ASME Code U-69.

THIONIZERS — 3—5'-3" I.D. x 121'0" high, 3/8" shell—1st 40 feet. 5/16" shell to 110 ft. level. Octagonal shaped tank 7'0" across flats above 110' level. Total overall height 121'0".

CENTRIFUGAL PUMPS — 3—Frederick Iron & Steel Co. Size 8" DSV-SM. Rated 2500 GPM at 150' head. Direct connected to 125 HP Wagner Electric, TEFC, 1750 RPM Motor with control.

VACUUM PUMPS — 9—Stokes Machine Co. Hi-Vacuum Pumps Model #212-B. Single stage rotary, 100 cu. ft. V-Belt driven by 5 HP 3/60/220/440 motor.

STACKS — 3—5'-3" dia. x 110' high, 3/8" and 5/16" plate with reinforcing bands every 10'8".
92—30" diameter x 30' high.

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NEW 1943—EXCELLENT CONDITION

PIPE — 30" dia., 3/16" wall, welded, 29 & 35 ft. Lengths—3100 ft.
DIAMOND FLOOR PLATE — 50 ton.
STEEL TUBING — 12¼" OD, 1⅛" wall, 12 to 16 ft. Lengths—15000 ft.
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CHANNELS — 15"—20 ft., 33.9# per ft.—100 ton.
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ANGLES — 8x6x¾"—16 ft. to 19 ft., 33.8# per ft.—20 ton.
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BIDS will be received by the City of Muskogee, Oklahoma, for Apx. 15800 L.F. of 4" Steel Pipe to be salvaged by buyer, average depth 2½ to 3 feet, Dresser Sleeve connected. Bids close December 15, 1948 Address: J. R. Keeth, City Engineer, Muskogee, Oklahoma.

FOR SALE: At Ponca City Refinery, approx. 4,000 1 gallon lithographed new insecticide cans. 10c each take entire lot Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: We have abandoned several gasoline plants in Oklahoma and have available, cheap, quantity such items as absorbers, centrifugal and steam pumps, gas and steam turbines, steam engines, closed type heater and cooling sections, cooling towers, horiz. engine compressor units. Catalog with prices listing such material available upon request. Cities Service Oil Company, Patridge, Bartlesville, Okla.

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE

Three 8000′ capacity steam rigs complete with 129′ releg derricks and substructure, blowout preventers, drill pipe, and everything ready to put to work. Rigs located at or near Alice, Tex.

For further information, write

AL BUCHANAN DRILLING COMPANY
2114 Alamo National Bldg.,
San Antonio, Texas

or Frank Buchanan, c/o Al Buchanan Drilling Company, Box 1308, Alice, Texas

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x8, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. — Denver 17, Colo.

LINE PIPE

Fabricated

8⅝", 10¾", 12¾" up to 36" OD in 10 ga., 3/16", ¼", 5/16" and ⅜" Wall

AVAILABLE NOW

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448 So. Hill St.
Los Angeles 13, California
Phone: MUtual 4132

EQUIPMENT FOR SALE

MARTIN DECKER Slim Hole Weight Indicators. Reconditioned. Guaranteed New—$300. Ours—$135. Columbia Supply Co., 911 E. Independence, Tulsa, Oklahoma.

CARDWELL Double drum Model RL spudder used only 6 months, excellent condition, complete with lines, tools, light plant, etc. Folk Drilling Co., Yukon, Okla.

FOR SALE: Steam Rig Complete $17,000.00, Union Tool Draw Works, 3 Donovan Boilers, stand inspection; Regan crown and block; 2 Lucy Pumps, Link Belt Shale Shaker. Approximately 7500′ 4½″ Drill Pipe. Can be inspected at any time. S. E. Frogge, Box 4455, Oklahoma City, Okla.

FOR SALE: 3—Buda 6-cyl. DCS-1879 300 HP Supercharged Diesel Engines—very good condition — attractive price. The National Supply Company, Fort Worth, Texas.

FOR SALE OR TRADE

10,000′ 5½″ 14# Seamless Casing located Oklahoma City. Prefer to participate in oil deal. Write details. Box 995, Dallas, Texas.

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE

15 bbl. Welded Water Tank.
60 bbl. 22′ high Welded Receiving Tank.
100 bbl. 8′ x 10′ Welded Receiving Tank.

TULSA SUPPLY COMPANY
P. O. Box 294 Phone: 3-6459
Tulsa, Oklahoma

STEEL TANKS IN STOCK
2—74,000 BBL. LIKE NEW 114′ X 40′ TANKS ARE CLEAN — AT MORGANTOWN, W. VA.
1—5000 BBL. BOLTED AT NEW YORK
5—1000 BBL. & 4—100 BBL. BOLTED AT NEW YORK
DARIEN CORP., 60 E. 42ND. ST., NEW YORK 17, N. Y.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @ 1200 RPM. Never been used. 20% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17′ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

EQUIPMENT FOR SALE

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000′ —Respooled for Your Inspection — Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: Wilson Mogul draw works powered by G.A.K. Waukesha engine. Good condition, priced for quick sale. Terms. Melton Supply Company, Seminole, Oklahoma.

AUTOMATIC WELDING MACHINE SPECIALS

2 Union melt units, 1,000 Amps Westinghouse transformer, Flux Arc Recovery Units. Many Extras. Lots new parts. Fraction New Price.

COLUMBIA SUPPLY COMPANY
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FOR SALE: Emsco G-350 Draw Works bought July 1, 1948. Powered with two D-13000 Cats, or I will keep motors and you can equip with any you desire; or I will sell complete rig with mast. Draw Works designed for three motors. Rig is better than new because it will cost less and is complete with everything needed on rotary drilling rig. Reason for selling, too much rig for work in this area. This equipment will stand inspection. C-691, The Oil and Gas Journal, Tulsa, Oklahoma.

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100 KW. DIESEL ENGINE GENERATOR SETS

15—100 KW 120/240 V.D.C. Delco Generators dir. con. to 150 HP., Model GDB-8, 5½x7, 8 cyl. Superior Diesel Engines, electric starting with muffler, power panel and accessories.
2—100 KW Delco 220/440 v. 3 ph. 60 cy. AC Units same as above.

PRACTICALLY AS GOOD AS NEW
ONLY USED FOR SPARES

Duquesne Electric & Mfg. Co.
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CRUDE OIL FOR SALE: 42°A.P.I., approximately 1500 barrels per month, possibly increasing to 15,000 per month in one year, handled by Interstate Pipe Line Carrier. Will sell to highest bidder (field price $2.65). Box C-694, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

INVENTIONS greatly increasing all oil production need capital for commercialization. Four patents pending. Tremendous potentialities. Minimum acceptable investment $5,000.00. N. B. Dismukes, P.O. Box 5176, Dallas, Texas.

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OPERATING Personnel Lists of Production, Refining, Natural Gasoline, Pipelines, Drilling, Supply Stores, etc. Guaranteed. Catalogue Free. Our 29th Year. Oil Industry Mailing List Co., Box 2603, Tulsa, Okla.

HELP WANTED

WANTED: Supervisor for refinery pump and engine maintenance. Applicant must have engineering training and experience. Good salary with house furnished at low rent. Box C-692, The Oil & Gas Journal, Tulsa, Oklahoma.

SUPERINTENDENT needed for new natural gasoline plant in northwestern New Mexico. Must be capable of inspecting construction work now in progress and training personnel. At least two years college training and prior supervisory experience necessary. Send details of experience and education to Southern Union Gas Company, 1104 Burt Building, Dallas 1, Texas.

WANTED: Geologist for supervisory and administrative duties exploration and drilling project Middle East. Should have some experience in seisimc and surface work. Age 30 to 45. Reply Box C-704, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIGNER

A nationally known valve manufacturer with several U. S. plants, supplying the oil and gas industry, has an excellent opening for an experienced valve designer. Must be thoroughly acquainted with valve industry and have creative ability. Good income, permanent and offers right man a responsible place. Give full particulars in first letter.

Box C-706

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

UNITED GEOPHYSICAL COMPANY, INC.

has openings in both North and South America and the Middle East for

Experienced Seismic
Party Chiefs
Seismologists
Computers
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Drillers

595 East Colorado Street, Pasadena 1, California

RESEARCH POSITION

Investigation of fluid flow in petroleum reservoirs and associated problems. Training in Physical Chemistry or Petroleum Engineering with experience desirable. Position is permanent. Working conditions excellent. Location Western Pennsylvania with major oil company. Salary open. Write giving pertinent personal and technical data in first letter.

Box C-703
The Oil and Gas Journal,
Tulsa, Oklahoma

EQUIPMENT FOR SALE

CAST IRON PIPE

Bell and Spigot Class 150 and 250

2,100 ft. 4 in.		
21,500 ft. 6 in.	14,250 ft. 10 in.	3,000 ft. 20 in.
16,280 ft. 8 in.	32,450 ft. 12 in.	11,000 ft. 24 in.

12 ft. and 18 ft. lengths

Immediate Delivery Any Quantity

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-377) Kansas City 18, Kansas
THatcher 9243

HELP WANTED

ROCKY MOUNTAIN AREA oil jobs our specialty. Petroleum engineers, geologists, chemists, surveyors, draftsmen, write for information. Professional Placement Service, 613 Mack Bldg., Denver, Colo.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr. Phone 4-5974. No fees to pay. Needed in Persian Gulf area, Middle East. Division Pipeline Superintendent, salary open. Rotary drillers $565. Rotary derrickmen $495. Supervisory chefs $400. Oilfield welders $425. Write for details.

HELP WANTED
PROCESS ENGINEER

Technical training and experience to handle problems on Natural Gasoline plant design. Furnish complete data and salary requirement.

Personnel Department,

CITIES SERVICE OIL COMPANY
Bartlesville, Oklahoma

FOREIGN EMPLOYMENT
In
SAUDI ARABIA

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Maintenance: ME's, EE's, CE's
Power Engineers and Assistants
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Surface Mapping
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Economic

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Production, Gas Oil Separators, Topping Still, Natural Gasoline Plant and Auxiliary Power Plants

Career employment opportunities. Room and Board furnished. Paid vacation in U.S. after each 24-month period. Retirement plan and liberal benefits.

If interested, apply by letter giving complete employment and personal history.

ARABIAN AMERICAN OIL COMPANY
200 Bush Street Dept. 'A'
San Francisco, California

HELP WANTED

CORROSION ENGINEER

Experienced corrosion engineer for electrolysis and corrosion mitigation work with large Middlewest Gas Company. Please write full details concerning experience and other pertinent data. Box C-700, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

For Houston and Gulf Coast Area, Man Qualified to head special Rotary Sales Department with Major Supply Company. Must have Engineering Degree. Give Age, Experience, Salary Requirements and References.

Box C-705

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

CHEMICAL ENGINEER

Exceptional opportunity offered engineer with experience in the fundamental design and operation of natural gas processing equipment. Primarily want person with ability and knowledge to direct and supervise engineering program and assist in sales. Letter of application should include photograph, personal data, record of education and experience, references, and expected salary range.

BOX C-695
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

PERSONNEL AND LABOR RELATIONS

Completely integrated oil company with approximately 1500 to 1700 employees has excellent opportunity to offer the right man—

Age—37 to 43 years.

Experience—Minimum of 5 years in Petroleum Industry in Personnel and Labor Relations, including actual experience in negotiating labor agreements.

Education—College, including some law.

Applicant must be Southern born or must have lived in the South for the past 10 years.

Salary—Commensurate with ability and experience.

Box C-698, The Oil and Gas Journal
Tulsa, Oklahoma

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

SITUATIONS WANTED

GEOPHYSICIST: Graduate Engineer with ten years seismograph experience as Party Chief and Supervisor over twelve state area desires position in seismic review or interpretation at permanent location. Presently employed as Supervisor of several seismograph crews. If interested, please give general information as to salary and position available. Box C-677, The Oil and Gas Journal, Tulsa, Oklahoma.

AVAILABLE JANUARY 1—Man, 40 years old, with 23 years experience as assistant pipe line supt., general foreman of construction and maintenance on pipe line and refinery work. Understands operation of pipe line and refineries. Would consider foreign employment. Can furnish written recommendations. Box C-709, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED to hear from Refiners who can use man with 20 years' experience in Light Oil Dept. Address: 331—S.W. 7th Street, Oklahoma City, Oklahoma.

MECHANICAL ENGINEER, graduate, 13 years' experience in sales, engineering, and service of production equipment in Mid-Continent area. Interested in equipment engineering for operator or sales engineering for machinery manufacturer. Box C-707, The Oil and Gas Journal, Tulsa, Okla.

LEASE AND DRILLING BLOCKS

830-ACRE block, Osage County, Oklahoma. Near production with four sands 1600 to 2050'. Will farm out block to responsible operator who is financially able to drill several wells and develop block. Box C-652, The Oil and Gas Journal, Tulsa, Oklahoma.

TO LEASE for oil 640 acres Reagan County Texas 5 miles S. W. Styles 3 miles north University lands Quarter mile south Centerela on Middle Concher River at Big Rock. L. B. Dougal, 2001 Concourse, Bronx, New York.

SURE SHOT FOR OIL

1000 Acres Texas lease on drilling contract. No cash involved. Near Fort Worth. Old well struck gas at 3440 feet. Should be sure shot for oil at somewhat lower strata. Box C-708, The Oil and Gas Journal, Tulsa, Oklahoma.

PROSPECTIVE new shallow, high gravity oil field, N.W. Ga. Mississippian, Devonian, shale and limestone exposures. Good structural indications. Drilling deals considered. Dietzen, Rt. 3, St. Elmo, Tenn.

BLACK Mesa Basin (N.E. Ariz.) acreage four structures fairly well blocked. Protective acreage other structures. Geology by C. C. Smith. Fred Blair Townsend, Luhrs Tower, Phoenix, Arizona.

WILL sacrifice 40 acre lease Lincoln County, Miss., 1/32 royalty interest in spread 4700 acres Ocala uplift Florida. 2½ acres mineral deed Grapeland field, Texas. Luella Schultz, 607 7th St. North St. Petersburg, Fla.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

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ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!
Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

WANTED: ROYALTIES AND PRODUCTION. We are buyers. Send full particulars. Immediate action. Gerber & Company, 120 Wall Street, New York.

OIL INVESTMENTS
LEASES ROYALTIES
Producing or Nonproducing
Oklahoma, Kansas, Illinois, Texas
Louisiana, Florida and Alabama
Prompt attention given inquiries.
CENTRAL ROYALTIES AND INVESTMENT CO.
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AVAILABLE immediately, manufacturing facilities consisting of large processing tanks 300,000 gallon storage capacity, tank car handling, 10,000 square feet warehouse, two 125 H.P. gas fired boilers, RR siding, labor plentiful. Location, Wichita Falls, Texas. Write Box C-710, The Oil and Gas Journal, Tulsa, Oklahoma.

Equipment Men

(Continued from page 160)

Co. of Petrolia, Pa., a company which was purchased by Koppers in 1947. The Petrolia plant is now operated as one of five plants of Koppers Chemical. Pottenger will have offices at Koppers headquarters in Pittsburgh.

Baker Oil Tools Advances Marker

Baker Oil Tools, Inc., has promoted E. E. Marker to the position of branch manager of the Houston area of Texas Gulf district. Marker has been in Baker service for 13 years in various capacities, and is well known throughout the Mid-Continent and Gulf Coast areas.

Cooper Alloy Coordinates Advertising Under Black

Cooper Alloy Foundry Co., Hillside, N. J., announces the coordination of all advertising, publicity, and public relations activity under the direction of George Black, public-relations division manager.

A graduate of Brooklyn College, Black also studied at Johns Hopkins University before joining the inspection division of Glenn L. Martin Co., Baltimore. Early in 1947, he joined the nickel sales division of International Nickel Co., where his primary concern was publicity activity relating to nickel steels and irons, stainless steels, and nickel electroplating.

Hallett Heads Ryerson Sales at Los Angeles

C. H. HALLETT

Joseph T. Ryerson & Son, Inc., steel distributors, has appointed C. H. Hallett as manager of sales at its Los Angeles plant.

Following his graduation from Northwestern University, Hallett became a member of a special training group at Inland Steel Co., Chicago, where he secured experience in practically all phases of steel-mill operations. He became associated with Ryerson in 1941, serving first in various departments of the company at its Buffalo plant and later at Chicago in the capacity of assistant to the sales manager. He was transferred to Los Angeles in 1948.

Churchward Manufacturing Workboats for Creole

Churchward & Co., Inc., West Haven, Conn., is manufacturing workboats under a contract awarded them recently by Creole Petroleum Corp., a subsidiary of Standard Oil Co. (N. J.). This calls for the construction of 51 all-welded steel workboats. Total value of the contract is in excess of $1,000,000.

The vessels, ranging in size from 32-ft. launches to 50-ft. tugboats, will be used in the Venezuelan operations of Creole on Lake Maracaibo. Twenty-two of the craft, of all-steel construction with deck houses, flooring, and engine boxes of aluminum, are powered with three-cylinder General Motors diesel engines. These vessels have a length of 32 ft. and seating capacity for 10. Upon completion the craft are sailed under their own power to Bayonne, N. J., where they are taken aboard ship for shipment to South America.

Ten personnel carriers with a seating capacity of 22 men, large working cockpit, and speed of 23 m.p.h. comprise the second section of the contract. These 10 vessels are 45 ft. long. A speed of 23 m.p.h. is obtained by the use of twin six-cylinder General Motors diesel engines. Four of the 45-ft. workboats are being completed as fire boats.

The largest part of the contract deals with the construction of nineteen 50-ft. tugs, heavy-duty workboats built of ¼-in. steel plate and designed to stand by the offshore drilling rigs in all weathers. Powered with 170-hp., 6-cylinder Buda engines, these 50-footers resemble the conventional tugboat both in appearance and performance.

Churchward & Co. became a factor in the boat building industry 2 years ago when it began mass-producing 26-ft. Steelcraft cruisers. It is expected that the contract will be completed about April 1, 1949.

Schlumberger Wins Shipping Award

Schlumberger Well Surveying Corp. and Carl A. Johnson, export expeditor of the company, were recently awarded the William H. McGee & Co. trophy in the first annual national competition among companies engaged in export business. The award was given for having the lowest percentage of lost or damaged export shipments during the past year.

With export shipments which totaled nearly a million and a half dollars to 18 different countries throughout the world, the Schlumberger reported loss was only $87.18. The shipments involved more than 1,600 boxes which ranged in size from radio tubes to complete Schlumberger truck units.

Carl A. Johnson receives trophy

William H. McGee Co., marine underwriters, began the export crating and shipping competition to encourage better and sturdier packing for foreign shipments. The award, an elaborate gold trophy with a large base simulating an export package, will remain in the possession of the Schlumberger organization for 1 year.

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CALENDAR OF EVENTS

December

National Gasoline Association of America regional meeting, Amarillo, Tex., December 10.

Interstate Oil Compact Commission, quarterly meeting, Allis Hotel, Wichita, Kans., December 9-11.

1949

January

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich. January 10-14.

February

American Society for Testing Materials spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

National Association of Corrosion Engineers, annual convention, Cincinnati, Ohio March 7-10.

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex March 9-11.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association thirty-seventh annual meeting, Plaza Hotel San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting San Francisco. March 27-April 1.

April

American Petroleum Institute, Division of Refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, Netherlands-Plaza Hotel, Cincinnati, Ohio, April 11-13.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

American Petroleum Institute, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 27-29.

May

Independent Petroleum Association of America, mid-year directors meeting, New Orleans, La., May 2-4.

American Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

American Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

June

American Society for Testing Materials, fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J., June 27-July 1.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

Oil Equipment Carriers Get Marshland Exemption

WASHINGTON.—An indefinite continuation of exemption granted water carriers from the requirements of the Interstate Commerce Act with respect to their operations in marshland oil fields was granted last week by the Interstate Commerce Commission.

The exemption was originally granted in 1941 to contract carriers engaged in leasing or chartering vessels for the purpose of transporting machinery, materials, supplies, and equipment used in the construction, development, operation, and maintenance of oil and natural-gas facilities in the marshland fields of Louisiana and Texas.

A request that the order be continued when it expired this year and that it be extended to other states where similar operations are under way was filed with the commission last April.

In continuing the exemption until further order, the commission broadened it to include Alabama, Florida, and Mississippi.

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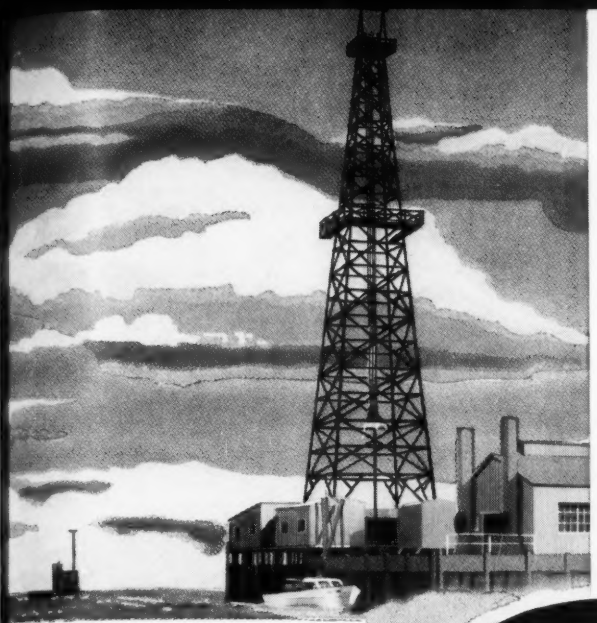

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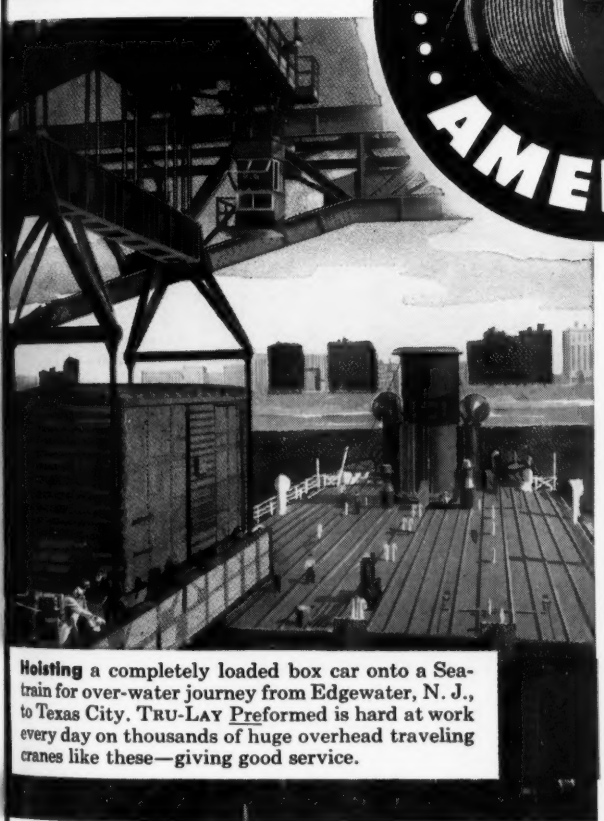

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Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

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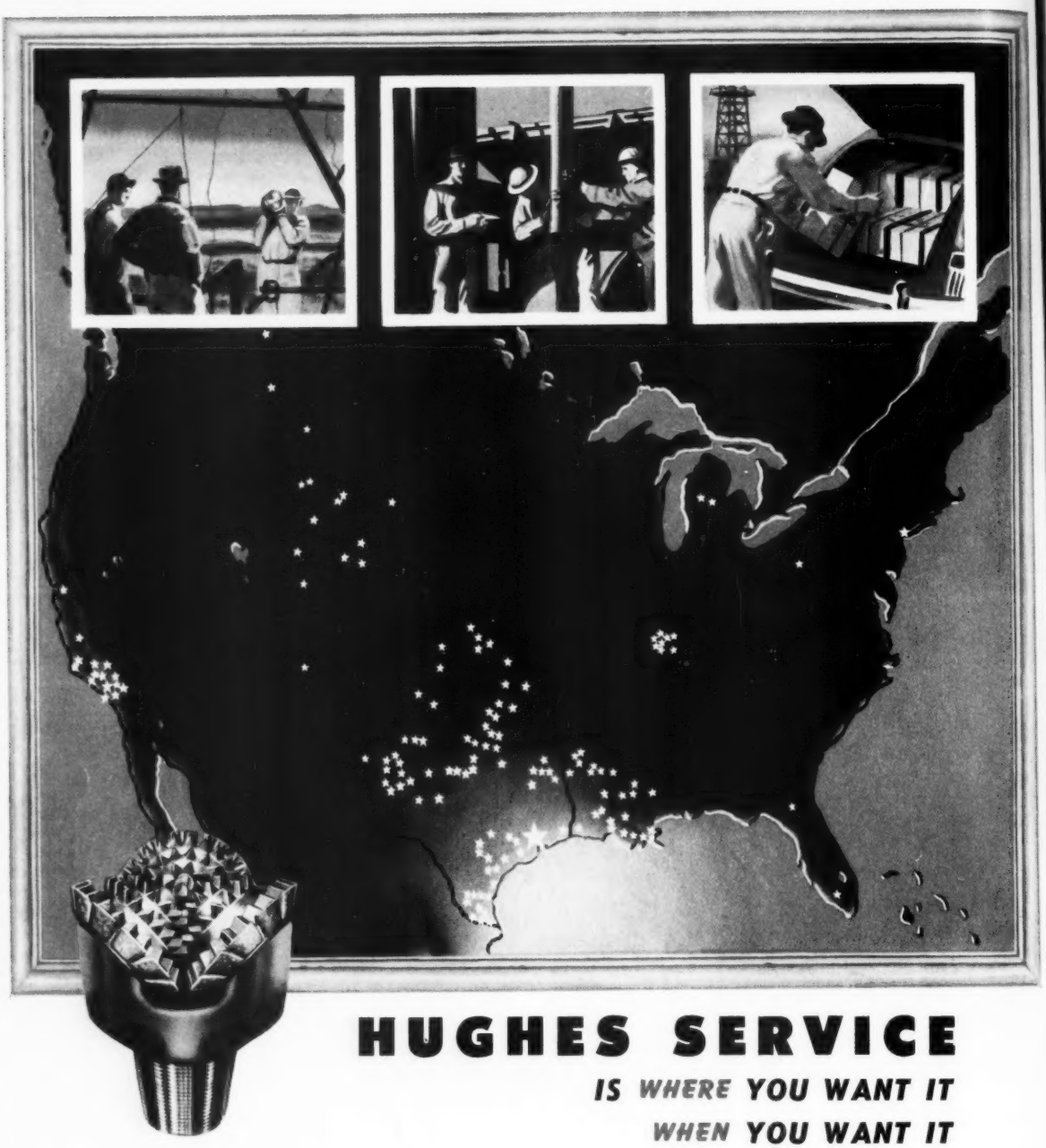

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